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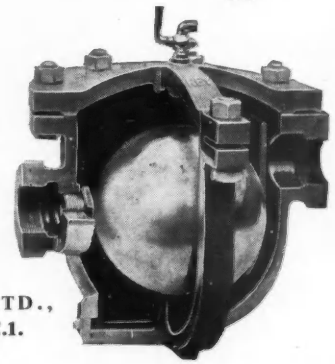
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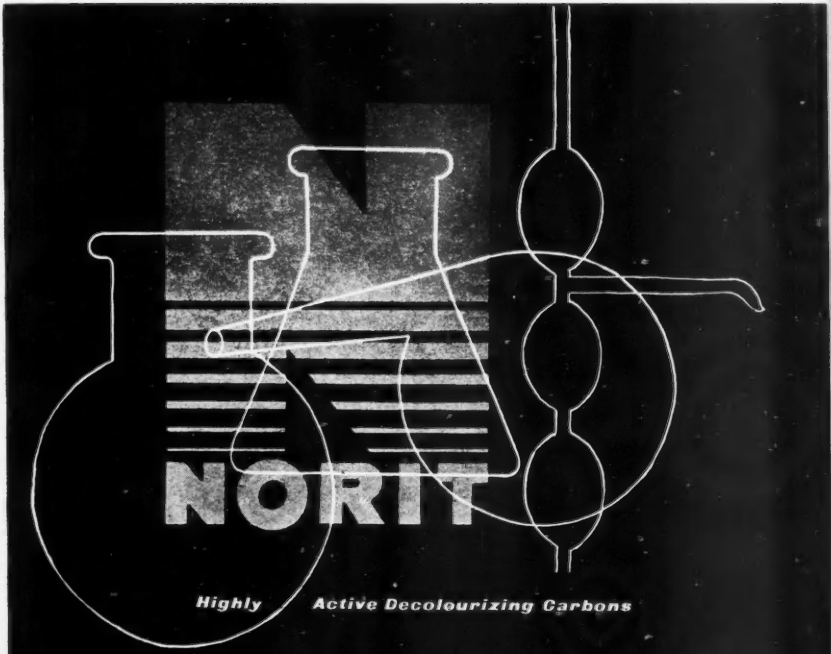
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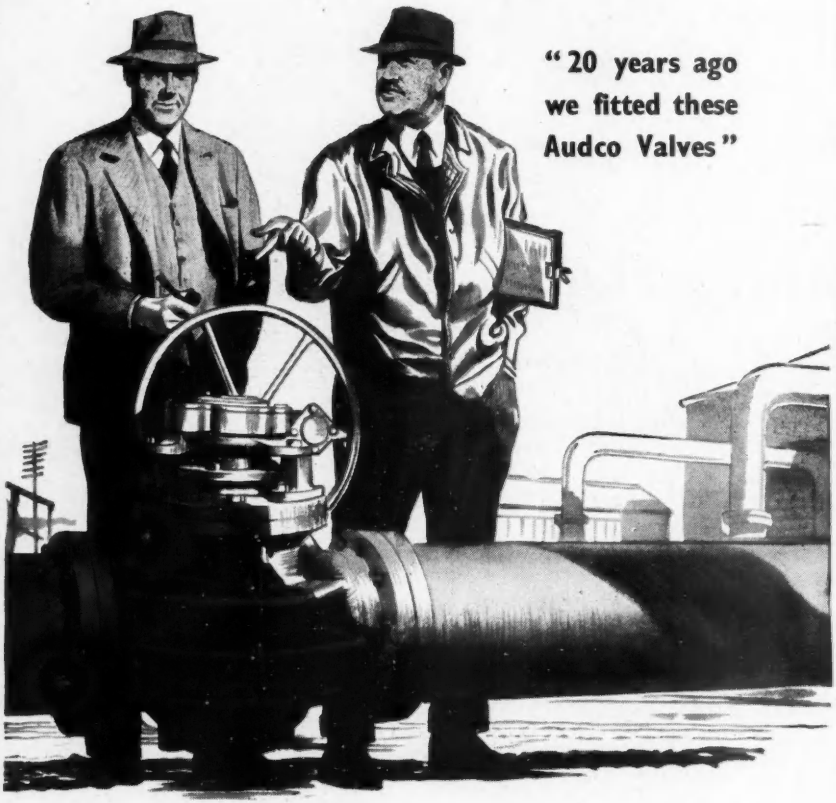
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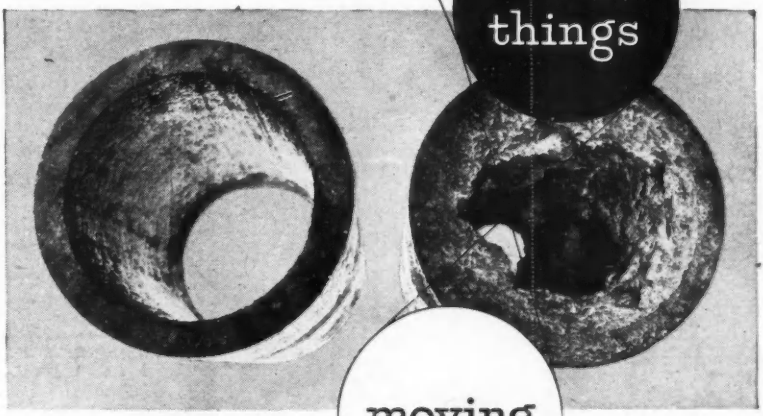
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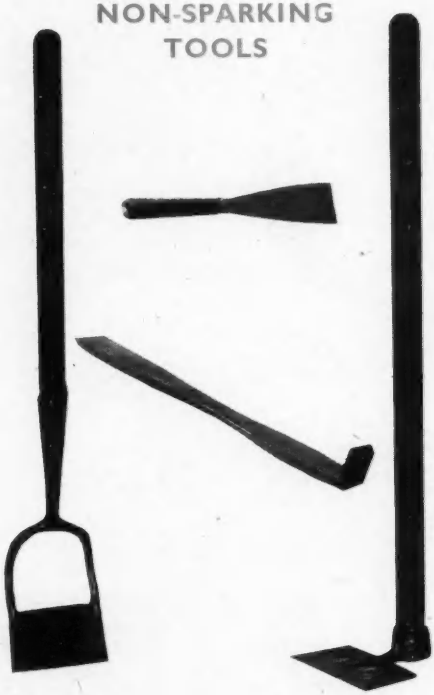
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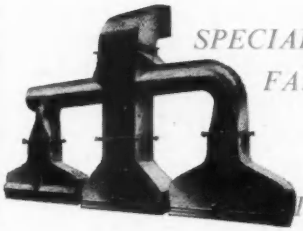


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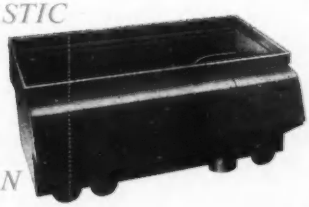
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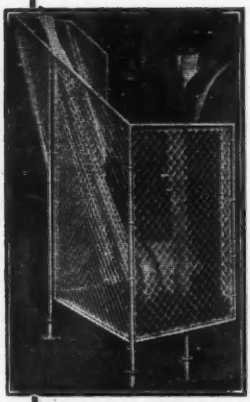
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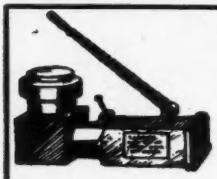
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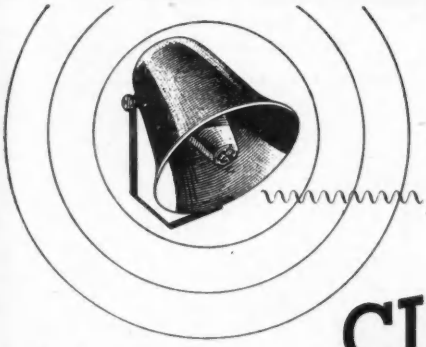
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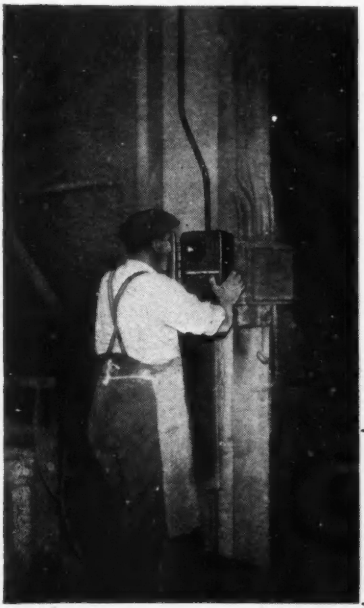
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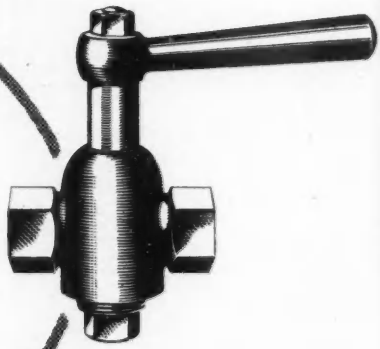
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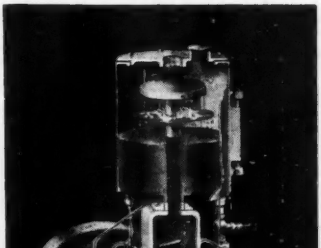
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Freedom of the Air

PUBLIC opinion can be greatly stimulated on trivial matters, yet remain totally insensitive to serious ones. In December, 1952, some 4,000 people died in London and many more became ill as a result of the prolonged 'smog.' But about this kind of 'freedom of the air'—everyman's right to discharge wastes into the common atmosphere—there has been much less debating than there has been regarding commercial television.

Certainly the interim report of the Beaver Committee (see THE CHEMICAL AGE, 1953, **69**, 1215) focused public attention somewhat fearfully upon the problem; but the winter of 1953/54 brought its lower incidence of fog-settling conditions and fogs dispersed before they had hung long enough over thickly-populated areas to accumulate the smoke that turns them into smogs. 'Don't worry, it may never happen' is one of the British articles of faith. We do not seem to realise, however, that 'Don't worry, it may never happen again' is a very different formula. A few weeks ago a medical report on the London smog disaster informed us that almost every person who died then was already suffering from heart or respiratory disease. This may be true enough, but its effect upon public opinion could hardly have been worse. It promotes the background view that all fit people can survive multi-day smogs and those who must unfortunately die would not have had long to live anyway.

Perhaps the determination to bring about obvious reforms must always be a minority determination — certainly the history of social reforms in this country suggests this. For many years and during a period of shocking waste of seamen's lives, Samuel Plimsoll fought for the load-line on ships—yet 'Plimsollism' was violently attacked in its own time and even when it was beginning to invade the legislation. As a modern writer on Plimsoll has said: 'He had done more than any man in this field to create that sense of urgency without which a reform can never reach the Statute Book. It was not facts alone that were needed, but indignation and anger.' Our contemporary problem of air pollution may need its Samuel Plimsoll. The Beaver Committee before starting on its detailed studies gave the warning that there can be no material improvement 'unless there is general acceptance of the fact that the cure will require heavy expenditure and full co-operation of all persons and interests.'

A valuable contribution to this grim and grimey subject has recently been made by PEP, whose latest issue of *Planning* (August, 1954, **20**, 369) is called 'The Menace of Air Pollution.' It is a more forthright document than the Beaver Committee's interim report, yet it will probably attract less attention. The general inadequacy of smoke legislation is clearly revealed. Briefly, the law can be used to promote excessive smoke abatement, but not the prevention of smoke. Nor does it take any account of domestic smoke. The 1926 amendments of the main enactment of 1875 (in the Public Health Act) introduced powers for by-laws requiring new buildings other than private houses to have smokeless equipment installed, but by-laws acceptable to the Ministry concerned have never been devised. A clause in the 1875 Act preventing action against certain kinds of industry was still retained in the 1926 amendments despite opposition.

Post-war local Acts, beginning with the Manchester Corporation Act of 1946, have seemed to be making better progress in anti-smoke legislation. In areas controlled by some 40 local authorities, all new fuel-burning equipment must be approved before installation. In effect, however, this modern phase of legislation is ambiguous; in most cases it is required only that the plant 'shall be capable of being used smokelessly' and further action cannot be taken if the original plans were submitted and approved. Thus, when smoke prevention depends upon how the plant is operated — a fairly frequent condition—offence is actually protected. Another advance more apparent than real is the legal creation of smokeless zones, a power now included in 17 new local acts. So far it has led to the setting-up of three such zones, 30 acres in Coventry, 104 in Manchester and 67 acres in Rochdale. (However, several more smokeless zones are soon to become effective, and the largest in the country will be the whole of the City of London.) In these smokeless zones the visible emission of any smoke is prohibited. So far the enforcement of this rigorous standard has not been difficult, for the initial areas chosen have contained no industrial works and few domestic premises other than caretakers' flats. It is better to have a few smokeless zones than none at all, but it is obvious that they must be small both in size and number so long as their practical existence rests upon an absence of factories and scarcity of domestic habitations.

But laws are one thing, administration and enforcement another. To quote the PEP document: 'The effectiveness with which the law is administered varies widely.' In most areas inspection forms one of the diverse collection of sanitary officers' duties; specialist smoke inspectors are rare. Local interests, not only those of industrial ownership or management but equally those of employment, may often influence the extent to which the law is pressed home. The full enforcement of existing laws would need more inspectors than the country could provide, e.g., in Chicago 40 smoke inspectors are regularly employed and in England and Wales there are only 25 sanitary officers working as specialist smoke inspectors.

In so far as industrial smoke is concerned, the paradox is that fuel efficiency and smoke prevention are two sides of the same coin. Smoke is not only a pollutant of the common atmosphere, it is also a token of needless waste. Technically, the domestic problem is much less malleable. If there is ample room for tightening the law in regard to factory smoke, it is still impossible to impose useful laws upon householders. Smoke-consuming fires are not cheap; and converting an open fire into one that is truly smokeless means that it ceases to be in effect an open fire at all. Smokeless fuels provide the practical, over-all solution but their total annual usage (which is presumably closely equal to availability) is 5,220,000 tons. Domestic consumption of coal amounts to at least 30,000,000 tons. In short, some 25,000,000 more tons of smokeless fuels must be made available if house chimneys are to cease to be open sewers of air pollution. There is no really clear sign that the present national fuel policy places an urgent emphasis upon the increased production of smokeless fuels. Actually, some 37,000,000 tons are produced each year but much of the coke, including hard coke for furnaces and foundries, is designated for the industrial market. This, indeed, reflects some amount of success for smoke abatement propaganda and legislation; for a great deal of the coke used upon steam-boilers is thus used to prevent smoke emission.

The total solution of air pollution is not within reach and legislation cannot anticipate technical progress. But this need not serve as an alibi for apathy and inaction. The surface of partial solution has only been scratched; big reductions in the extent of air pollution are possible by present means and knowledge and have been possible for years. Given the public will to face the problem squarely, there is much that can now be done to minimise the flow of smoke into the air we all breathe. The PEP study should certainly be digested by all scientists; it probably anticipates much that will be stated in future reports of the Beaver Committee, but, more important still, it can help to create the proper climate of public opinion.

Notes & Comments

The Midlands Symposium

ON Wednesday the symposium organised by the Midlands Society for Analytical Chemistry came to a close and reluctantly the 300 delegates departed for their homes—homes separated by several thousands of miles and scattered throughout 15 countries in addition to the UK. This reluctance, so obviously genuine, was a true indication of the success of the symposium. Many worthwhile gatherings are held each year by national or international bodies in the fields of pure or applied chemistry but few can have bettered this eight-day meeting. The lectures were of a high standard, the works visits and social functions were planned and run to near perfection, and the exhibitions were well laid out and managed. The support from industry and the University was full-hearted and generous. But the main reason for the success of the symposium was the friendly atmosphere that existed. Differences in nationality, language, age and/or academic, social and economic standing proved flimsy barriers between people who enthuse about their work.

Enthusiasm Plus Energy

THE quiet satisfaction displayed by the organisers of the symposium was well earned, for many months of extremely hard work had been put into the preparations. As a matter of fact, the success of the meeting was a result of the constant labour of a handful of extremely busy people over a period of four years, or ever since the Society was formed. The committee could never have attracted such distinguished visitors as Professor Feigl, Professor Zacherl, Professor Duval and Professor West if it were not for the excellent reputation that the Society has acquired. And this reputation could never have been gained if it had not been for continuous effort on the part of the Society's officials. The MSAC may be young and it may be small compared with national or international associations or societies but it has a reputation which is firmly established and still growing. It may be that the time has come for the Society to join forces with a larger and better-known organisation, but if MSAC members acquire certain advantages from such an alliance the members of the other body concerned will also benefit. The enthusiasm, energy and wisdom of the principals of the Society would be a great asset to any organisation.

The Great Master

NO mention of the symposium would be complete without some mention of the principal plenary lecturer, Professor F. Feigl. The Professor, who at the moment is living in Brazil, has a reputation second-to-none in the field of chemistry and the demands on his time are myriad. Distinguished gatherings the world over are constantly seeking his services as a lecturer. Furthermore, his son is at the moment lying dangerously ill in Switzerland. But Professor Feigl is a man of high principles—he believes that he should share his knowledge with others. Great as has been his contribution to chemistry—and few can have contributed more—he does not feel that his work is finished. Quietly, modestly, without thought of reward, he continues to add to man's knowledge. No one who listened to his lecture on the opening day of the symposium could fail to recognise that Professor Feigl is one of the greatest of teachers. The admiration and affection shown for him by former pupils present was proof of this. His experiments and demonstrations never fail because he spends days in preparation. His patience with the younger student is infinite. Professor Feigl is no cold, dry-as-dust eccentric. He is warm, human, a man of great depth of feeling. His grief and worry showed but never did he let it come between him and those that were eager to learn from the master. Many pleasant memories will have been taken home from Birmingham but few more stirring than that of Professor Feigl—gentle, sad, an exile from his native Austria, a devoted father with a critically-ill son—patiently explaining his theories to an enrapt audience.

Concentrated Beer ?

AN interesting development in the Food Investigation Board's Report for 1953 (HMSO, 1954, 56 pp., 3s. 6d.) is the concentration of beer by freezing or vacuum evaporation. This has been investigated to facilitate overseas shipment and export trade; the reduction in bulk obtained can obviously reduce costs. Successful freeze-concentrations to between one-third and one-fifth of original volume, depending mainly upon initial gravity is claimed to be possible within a temperature range 10-14° F. Lower temperatures or greater concentration impair quality and cause the deposition of solids. The freeze-concentrates contain from 18 to 20 per cent of alcohol. Reconstitution is readily carried out by re-bottling with carbonated water so that the original refractive index is reached. With the more bitter beers there is a slight loss of bitterness, but this can be restored by the addition of dry hops after concentration but before storage. Concentrates do not need to be pasteurised. They keep well provided the storage temperature is low (32-41° F), but a vinous flavour develops within a few weeks at high storage temperatures. Vacuum evaporation has also proved to be a successful method of bulk reduction. Here, however, the alcohol is removed in the distillate and it must be recovered and returned to the concentrate. There is, as with freeze-concentration, a limit to the extent of volume reduction if solid deposition and loss of quality is to be avoided.

Polythene Price Lowered

Technical Progress Permits Reduction

ON Wednesday evening Britain's only producer of polythene, Imperial Chemical Industries Ltd., announced that they were reducing the price of this commodity by 3d. per lb. and on the following day, 1 September, the new price of 3s. 2d. per lb. came into effect. The price reduction is not a sign of a market slump but is the result of technological advances and of increased output.

Ever since I.C.I. began production of polythene in 1939, price reductions made possible by technical progress have been passed on to customers whenever possible. As the result of continued research and development, the economics of the production process have been improved, so that it is now possible to make 30 times as much polythene in unit volume of the expensive high-pressure reaction space as was possible 15 years ago. The oil-cracking process by which the ethylene is made gives a product of the necessary high purity and is the cheapest method available. I.C.I. believes that with continued growth in the scale of manufacture and attention to the detailed economics and technique of the whole process from oil to polythene, 'Alkathene' (the firm's trade name for the substance) will become as cheap as any polythene in the world.

No single property, such as melt viscosity, is adequate to describe a particular product, and it is now seen that a whole range of materials having different sets of properties can be made by the polymerisation of ethylene. Rate of extrusion, surface finish, toughness and tear strength, low temperature resistance, freedom from solvent cracking, chemical inertness, are all of great importance in one application or another, but no one polythene yet combines all the best qualities, and it may be that some properties are mutually exclusive.

It is I.C.I.'s intention to develop products suited to particular major uses even if, as is expected, this involves making a range of products. The design of the company's large-scale production unit makes it possible to vary synthesis conditions over a very wide range, and it has already been demonstrated experimentally that the I.C.I. process is flexible enough to enable the company to offer polythenes covering the spectrum of available properties.

Telex for Richard Klinger Ltd.

Richard Klinger Ltd., of Sidcup, Kent, have recently joined the International Telex Service, which is at present providing them with direct foreign teleprinter communication. The company's number is London 8709. Later on the service will be extended to include transmission within the UK.

Bowater's New American Mill

Some Details of South's Largest Plant

THE pulp and paper mill of Bowaters Southern Paper Corporation at Calhoun, Tennessee, started production in June and on 24 August full details of the new mill, which is Britain's largest capital investment in the US since the war, were released by the parent company, The Bowater Paper Corporation Ltd., of London.

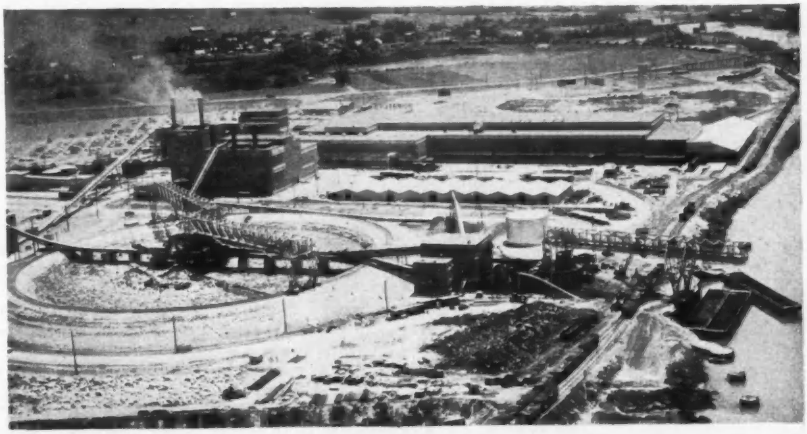
The mill was erected at a total cost of $60,000,000 (some £22,000,000) out of which $15,000,000, the total equity capital, was subscribed by the parent Corporation. The remainder of the money was subscribed in the United States by 12 of the largest American insurance companies and five of the leading banks. The initial capacity of the mill is 130,000 tons of newsprint and 55,000 tons of either bleached or unbleached kraft pulp annually, making it the largest of the four newsprint mills in the southern US. More than 150 firms from all over the US were engaged in the construction which took two years to complete.

The newsprint furnish requires approximately 360 tons of pine groundwood and 120 tons of bleached kraft pulp daily with the total kraft pulp requirements, including that for sale, being approximately 312 tons. Approximately 20 tons of salt cake, 8 tons of caustic, 8-18 tons of chlorine and 14 tons of lime is consumed each day. For the news furnish about 4,000 gal. of 32° Baume liquid alum is used as well as 1,200 gal. for water treatment. In addition large quantities of limestone, soda ash and chemicals for slime prevention, colour, etc., are required. A total of 906 cords of fast growing southern pine is used each day and 30,000 cords—or six weeks' supply—can be stored in the log pond.

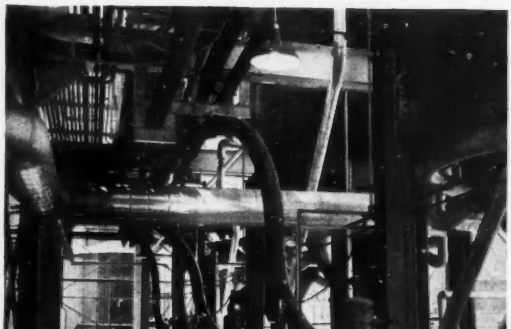
THE DIGESTERS

For the daily production of the 312 tons of raw kraft five digesters have been installed with space provided for a sixth. These digesters each have 3,300 cu. ft. capacity and have shells 2 in. thick. Each weighs approximately 62 tons. They discharge through electrically operated blow valves through individual lines to a blow tank having a capacity for three blows.

The blow steam, after passing through a special cyclone in the head of the blow tank, goes to an accumulator and blow steam recovery system for the heating of the water. The relief steam from the digesters



The new £22,000,000 Bowater's pulp and paper mill at Calhoun, McMinn County, Tennessee



A view of the mill's five digesters, each of 3,300 cu. ft. capacity, in which chips are disintegrated to produce strong chemical pulp

is carried to individual separators, thence to a relief cyclone, condenser, and decanter for the recovery of turpentine.

THE WASH ROOM

The stock from the blow tank is pumped through a specially designed trap to the pre-knotters and three vacuum type washers. The stock from the final washer is delivered by a conveyor to a high density steel storage tank of 100 tons capacity, equipped with dilution nozzles and agitators for the removal of the stock. The consistency of the stock is controlled at 3½ per cent by a pan type regulator, discharging directly into an agitated surge and blending chest.

The drop legs from the washers discharge to a weak liquor tank, 30 ft. by 35 ft.; an intermediate tank, 32 ft. by 35 ft. and a strong tank, 34 ft. by 35 ft. Three black liquor tanks, 25 ft. by 30 ft. provide storage. Adjacent to these is a weak soap collecting tank with connections at various levels for laundering off any soap that would accumulate on the black liquor storage.

Foam lines from the liquor tanks go to a foam tower 15 ft. by 60 ft., on top of which is a foam breaker. In the strong black liquor filtrate tank a screw type soap skimmer launders off soap and excess liquor, which discharges by gravity into the foam tank. Weak soap is separated here and also pumped to the soap storage tank.

The rejects from the preknotters discharge by gravity into a black liquor measuring tank, 9 ft. 6 in. diameter by 20 ft. high; provided with an agitator and a special pump so that the knots are returned to the digester with a black liquor fill. White liquor for the digesters is obtained by gravity flow from a tank 9 ft. 6 in. by 20 ft., set above the digester room floor, receiving its supply from the recausticising plant storage.

The washers are mounted on the same floor level as the digester charging floor and are provided with hoods and exhaust fans. A 15-ton hand operated crane serves the wash room.

THE SCREENROOM

In the screenroom the washed stock is pumped from the surge tank at ground level after the high density storage, to a consistency regulator and a primary constant level mix tank feeding two primary centrifugal screens; the accepted stock from which discharges by gravity to two 9 ft. 6 in. by 10 ft. valveless type thickeners, and thence into a screened stock chest. The rejects from these primary screens discharge into a tank 8 ft. by 18 ft. from whence they are pumped to another regulator and mix tank to a secondary screen. The accepted stock from

this latter screen discharges into a tank, 8 ft. by 18 ft., from where it is returned to the screened stock chest or directly to the pulp dryer machine chest. The tailings from the secondary screen go to a secondary rejects tank, 8 ft. by 18 ft.; from whence they are pumped through a magnetic separator, then to a drainer and a disc type refiner, thence to the primary rejects tank for recirculation and re-screening in the secondary system.

THE BLEACH PLANT

From the screened stock chest in the wash room basement, as much pulp as it is desired to bleach is pumped at regulated consistency through brushing jordans to a tonnage control unit serving the chlorinators of a 3-stage bleach plant.

The chlorination stage consists of a tile lined steel tower, 18 ft. diameter by 61 ft. high, with two-tier arrangement or rubber lined steel circulators and a rubber covered skimmer to a launder at the top of the tower.

Chlorinated stock is pumped to an 8 ft. by 14 ft. rubber covered single vacuum washer, with shredder and conveyor for discharging through the high density double shaft mixer of cast iron to a caustic extraction tower of unlined steel, 10 ft. diameter by 47 ft. high; with one circulator of cast iron and 304 stainless steel construction.

Stock at the bottom of the caustic tower is diluted by about 2½ per cent consistency by nozzles for pumping to a cast iron single valve vacuum washer with shredder and conveyor for delivery at high consistency through a double shaft mixer to a steel, tile lined hypochlorite tower, 17 ft. diameter by 17 ft. high, provided with two 304 stainless steel circulators.

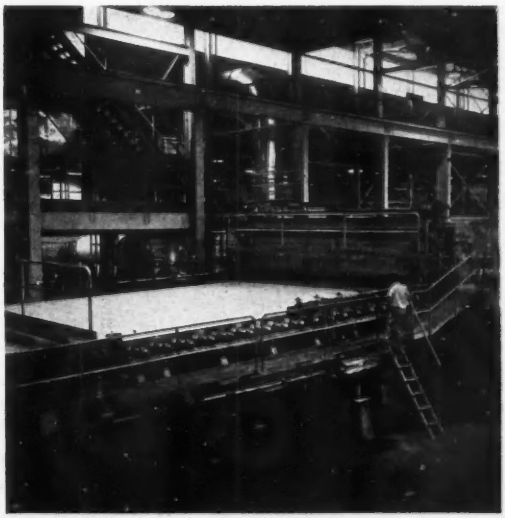
At the bottom of the hypochlorite tower, the high density stock is diluted by nozzles and pumped to an 8 ft. by 14 ft. final washer with rubber covered repulper, this washer being arranged for use with a future SO_2 stage, should the bleach plant be expanded.

Stock from the final washer passes through a pan type consistency regulator which discharges directly into an agitated low density tile storage tank, 16 ft. diameter by 18 ft. high, from whence it can be pumped either to the newsprint mill or to the pulp dryer, as desired.

The meter box, washer vats, and seal pits are all of structural type construction.

The seal boxes are on the mezzanine floor, with all of the pumps for both stock and white water located in the basement.

The upper part of the building from the washer floor up is totally enclosed, pres-



One of the two Fourdrinier newsprint machines, each of which has a wire width of 252 in. and is designed for speeds up to 2,000 ft. per minute

surised to eliminate corrosion, with exhaust fans for removal of vapours from the washers and towers. Filtered air is provided for air sweeping the instruments, motors, controls, etc.

Effluent from the chlorination and caustic stages is carried to a tile foam tower, which receives also exhaust fumes and foam from the seal pits.

A glassed-in partition on the operating floor encloses the control instruments, test laboratory, and office.

While the immediate plant is a 3-stage for semi-bleached, full provision has been made for adding another caustic, hypochlorite and SO_2 stage or for chlorine dioxide should the mill desire to manufacture full bleach.

PULP DRYING

For the drying of the unbleached or bleached pulp for sale, a combination high density feltless wet machine and a hot air dryer is used.

The wet machine is of the 2-press type with vacuum forming cyinder, 8 ft. diameter by 156 in. face, with three airloaded press rolls. The first main press has grooved cast iron top roll and bottom roll which is followed by a 2-drum dryer section, 60 in. diameter, and a second press similar to the first.

The dryer built to trim 156 in. receives the pulp from the second press, with pinch rolls to feed it into the upper section of the dryer which is divided into nine passes, with the exit at the bottom. Forty fans supply the necessary air circulation, with the heaters of the extended surface type and copper tubes.

The fresh air intake to the dryer has filters to purify the makeup air, and fans have also been provided for cooling the vestibules. One 14-section economiser arranged for double stage effect is mounted on the roof over the dryer and supplies some water heating.

Equipment for cutting, laying, and conveying the pulp consists of a heavy duty cutter arranged to furnish from a 156-in. nominal trim five pulp sheets, 31¼ in. by 25½ in., and three 47 in. by 53 in. wrappers; the cutter being driven by a DC motor in conjunction with the dryer. Pulp coming from the cutter is delivered to the layboy of the heavy duty type, with the sheets carried on a series of narrow belts. The sheets are ejected from the tape unit to form vertical stacks, accumulated on the belt conveyor and lowering table. When the requisite number of sheets has been accumulated, the table lowers to its bottom position and discharges the stacks on to a conveyor, the table then raising the catch the pulp sheets accumulated during this operation on automatic fingers.

STOCK PREPARATION

There are two lines of equipment in the stock preparation room for supplying refined bleached kraft furnish to the paper machines; one line supplying each machine. Refining of bleached kraft is accomplished by four jordans. One small broke jordan is provided for each paper machine, and one 11 ft. 6 in. diameter by 16 ft. vacuum saveall clarifies the white water and thickens the broke from each paper machine. Metering of groundwood, bleached kraft, and broke in proper quantities is accomplished through proportioneering equipment.

THE PAPER MACHINES

Ahead of each paper machine there are five screens and one vibrating rejects screen for final screening of stock.

There are two 252 in. newsprint machines, designed for speeds up to 2,000 ft. per min. Stock and colour are metered to a 12,000 gpm. fan pump supplying the screens. Dilution water for this stock is obtained from the Fourdrinier savealls that discharge into a tile collector chest. Screened stock is then collected in a de-aerating flume and is further diluted prior to being pumped by a 17,000 gpm. fan pump to the pressurised type head box, with slice of latest design. The Fourdrinier has a 252 in. wide by 116 ft. long wire and is complete with table rolls, suction boxes, and savealls for separating the wire drainage from the wire shower water.

The press section consists of automatic suction pickup roll, a suction transfer press, wringer roll, and two straight through suction presses. The dryer section consists of 55, 60 in. diameter paper dryers and 11, 60 in. diameter felt dryers, divided into four sections. The calender stack is the open type, complete with eight rolls. The reel is the heavy duty type, equipped with the latest design of reel brake. The winders are high speed design, complete with shaft puller and roll lowering table.

STEAM GENERATION

A careful economic study of the proper primary steam pressure and temperature

resulted in the selection of 875 psig. and 825° F. One of the limiting factors in the determination of this pressure is the location of the mill in the low cost TVA power region. Steam at this pressure and temperature is produced in one recovery boiler, one bark burning boiler and two power boilers.

RECOVERY

For the evaporation of the surplus black liquor from the kraft mill, a 6-body, sextuple effect evaporator has been installed. The unit has sufficient capacity to evaporate 173,000 lb. of water per hour; with 34,500 lb. per hour of steam at 35 lb. gauge.

To condense the vapours from the sixth effect, a surface condenser of the vertical type is used, and consumes 1,800 gpm. of 70° water, with a temperature rise to 110°. A soap skimming tank with a paddle type mechanical skimmer removes the soap from the liquor between the third and fourth effects.

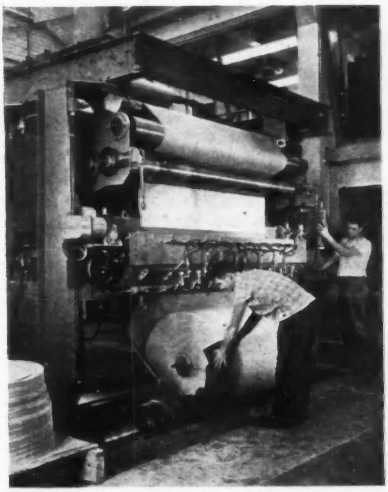
The chemical recovery unit for the burning and reducing of the dry solids contained in the black liquor has capacity sufficient to burn 950,000 lb. of solids per 24 hours; with a steaming capacity of 123,200 lb. per hour at 875 psi and 825° from the feedwater at 280°.

Preliminary evaporation on the unit is through a cascade evaporator, with wheels 14 ft. diameter by 9 ft. 6 in. face. Both FD, and ID fans are driven by motors, the latter having a hydraulic coupling for speed control.

For soot blowing, an air puff system has been furnished for the collector zone and the economiser passes, consisting of 16 head automatically controlled by sequential operation. In addition there are 12 retractable soot blowers for clearing of the screen tubes and superheater elements, all arranged for double side installation at six locations. These units are air operated with superheated steam for the cleaning medium.

For the handling of salt cake a pneumatic system is used to unload cars and deliver either into storage or the feed hopper of the unit.

For the recovery of salt cake and dust in the flue gases, an electric precipitator is furnished and installed as an integral part of the recovery building above the cascade evaporators. The unit consists of two electrical precipitators enclosed within a shell structure of combined hollow tile, steel, and reinforced concrete. Each of these units has an individual stack and is so arranged that with one of the units down, the other can still be maintained in operation.



Newsprint rolls, cut to the sizes required, are wrapped automatically on this machine

The recovered salt cake from the precipitators is collected and dissolved in four wet bottom pans through which concentrated liquor is circulated and its chemical strength built up.

THE CAUTICISING PLANT

The causticising plant consists of the following conventional systems: green liquor clarification, dregs washing, lime slaking, white liquor clarification, and lime mud washing. The design capacity is 30,200 cu. ft. per day of white liquor with 8 lb. per cu. ft. of total alkali and 7 lb. per cu. ft. of active alkali, all expressed at Na_2O with a sulphidity of 30 per cent. The plant can be operated up to a capacity of 38,000 cu. ft. per day. The white liquor clarifier and lime mud washer are of the multiple tray type, while the green liquor clarifier and dregs washer are of the single tray type.

LIME REBURNING

The lime reburning plant consists of a rotary lime kiln, 9 ft. by 250 ft. with four supports. At the feed end, a vacuum mud filter and a slurry feeder provide a constant

rate of feed. Fuel for the kiln is natural gas. The design capacity of the kiln is approximately 80 tons per day. The kiln can be operated up to a capacity of approximately 125 tons per day to handle peak loads and additional production. Limestone is used as makeup and is introduced by a table type feeder to the kiln feed conveyor. The limestone is stored in an overhead storage bin with a capacity of 47 tons, and provision has been made for a ground storage of approximately 100 tons. The limestone system consists of a track hopper, drag chain conveyor, bucket elevator, and necessary chutes.

WATER TREATMENT

The raw material for plant used is obtained from the Hiwassee River, about 2½ mile above the plant site. Vertical submerged type raw water pumps are installed, three pumps being used for the initial installation. These pumps have a capacity of 6,000 gpm. each, or a total of 18,000 gpm. The raw water is pumped through 12,000 ft. of 36 in. steel pipe, lined and coated, to a treating plant located on a hill above the plant site. The treating plant is a modern gravity type filtration plant utilising flash mixing, mechanical flocculation, settling and rapid sand filters. The clear well for the plant consists of an open, sloping side, concrete lined reservoir with a capacity of 4,000,000 gal.

The rate capacity of the water treatment is 25,000,000 gal. per day.

The lower section of the clear water storage reservoir is reserved for fire protection. Due to the elevation of the clear water reservoir, a gravity flow is obtained to the mill; consequently, no service water pumps are required at the treating plant.

EFFLUENT PLANT

The waste disposal system for the mill consists of a pump house for elevating the process waste to a primary settling basin; secondary treatment is obtained in a large disposal reservoir with a detention capacity of approximately 24 days for the entire mill process waste. The sludge from the primary settling basin is pumped to a permanent disposal area of 25 acres, located in a ravine on the mill property. The primary settling basin for the disposal plant consists of an earth lined reservoir, sloping sides, with mechanical rotary type sludge collector. The system is laid out for an addition of future units in the event the mill capacity is later increased.

One of the first requirements for newsprint manufacture is an adequate supply of wood, and Bowaters will have some 200,000 acres of forest land in Tennessee and adjoining states. A large scale afforestation programme has already started and by the end of 1954 some 10,000,000 pine seedlings will have been planted.

Lecture Courses

DETAILS of lecture courses to be given at Sir John Cass College, Jewry Street, Aldgate, London, E.C.3, during the autumn have been issued. On Thursday afternoons, beginning on 30 September, there will be lectures on the 'General Technology of Petroleum.' The lecturers will include L. W. G. Firmin, B.Sc., P. F. Ellis, B.Sc., A.R.I.C., M.Inst.P., and E. J. Boorman, B.Sc., Ph.D., D.I.C., F.R.I.C., F.Inst.Pet.

On Thursday evenings, beginning on the same date, T. A. Blanco White, Barrister-at-Law of Lincoln's Inn, will give a series of 12 lectures on 'Industrial Law.' 'Aerodynamics of High Speed Flow' will be dealt with in a course of about 20 lectures by T. H. Walton, M.Sc. (Lond.), B.Sc. (Manchester), on Tuesday evenings from 5 October. Also on Tuesday evenings, starting on the same date, A. G. Maddock, M.A., Ph.D., A.R.C.S., D.I.C, will give a course of lectures on 'Radiochemistry and Radioactivity.'

A course of about 30 lectures by T. H. Anderson, B.Sc., Ph.D., A.R.I.C., and laboratory work will be held on Tuesday evenings, on 'Fundamentals of Microbiology.' Various lecturers will take part in a course on 'Scientific Principles of Fuel Technology' on Thursday evenings, starting on 7 October. On Tuesday evenings, starting on 12 October, a course of nine lectures by H. H. Greenwood, B.Sc., Ph.D., will be held on 'The Quantum Theory of Molecules.'

Wages Go Up

Workers engaged in the manufacture of drugs and fine chemicals received wage increases in July. Minimum rates were raised by 6s. a week for men and 4s. a week for women, with proportionate increases for those under 21.

Testing Hardness of Water

Portable Set Saves Time & Trouble

WHERE water softening plant is employed in industry, it is essential that the hardness of the water should first be determined so that the utmost efficiency may be obtained. In some instances the actual hardness does not remain constant but varies from time to time necessitating further adjustments for effective working.

The Hardness and Alkalinity Testing Set of the Paterson Engineering Company Ltd., of London, forms a useful addition to any works where such a plant is installed.

The set comprises two automatic burettes, complete with reservoirs for Wanklyn soap solution and N/50 sulphuric acid respectively. Two each of the following are included:—porcelain titrating basins, dropping bottles and stirring rods, and also a shaking bottle and graduated cylinder. All these are fitted in a portable wooden case with carrying handle, lock and key. A supply of chemicals comprising soap solution, standard acid, methyl orange and phenol phtalein is also provided with the set.

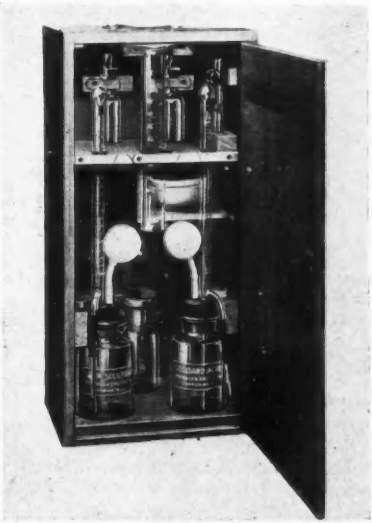
Prevents Errors

The solutions are kept free from dust, evaporation and contamination in both reservoir and burette. Merely by pressing and releasing the air bulb the burette is filled and the solution automatically adjusts itself to the zero mark. The equipment saves a considerable amount of time and trouble by preventing errors and has an additional advantage of occupying small space in the laboratory.

The method of testing for hardness is by soap test and is performed as follows:—Measure 70 millilitres of softened water in the graduated glass cylinder and pour into the stoppered shaking bottle marked '70 ml.' Then add Wanklyn's soap solution from the burette, about 1 millilitre at a time, replacing the stopper and shaking between each addition until there are signs of a lather forming, after which add the soap solution in smaller quantities until the lather formed on shaking remains unbroken after standing three minutes. Deduct one millilitre from the burette reading and the remainder represents degrees of hardness. (For reference this is known as 'H.')

To test for alkalinity, pour 70 millilitres of water into each of the two porcelain basins, and add to one a few drops of phenol phthalein solution. When a red colour is obtained, immediately add standard acid, stirring gently until the red colour is just destroyed. Note the reading of the burette, and the number of mls. of acid used represents degrees of alkalinity to phenol phthalein. Call this figure 'P.' Should no red colour be obtained, the alkalinity to phenol phthalein is nil, and no carbonate or caustic alkalinity is present.

Colour the contents of each basin with one drop of the solution of methyl orange, and continue the titration with the acid in the basin originally used, until the faintest sign of change from yellow to pink is noted (the second basin is used only for comparison in order that the first change of colour may be detected). The total number of mls. of standard acid added, including that used in the first part of the titration (P) represents degrees of total alkalinity.



The Paterson Engineering Company's Hardness & Alkalinity Testing Set

Bricks from Fly Ash

Works May be at Power Stations

AS a result of successful research by the Building Research Station, the British Electricity Authority is considering building brickworks at power stations.

At many modern power stations coal is ground to a very fine powder before being blown into the furnace. The ash from coal burnt in this way is as fine as face powder and its disposal presents a big problem to power station engineers.

Although some ash may be used as a partial substitute for cement in large scale concrete works, and some is being used in the manufacture of lightweight concrete blocks, there are few uses that offer a prospect of using the entire output of a number of large power stations. Of these few, the most promising is the manufacture of bricks, of which 7,000,000,000 are made yearly.

Saves Fuel

The use of small percentages of ash (up to say 20 per cent) in brickmaking is nothing new and many existing brickworks have tried making such additions. With some kinds of clay the addition of ash is beneficial, as the clay is made less sticky and it can be dried and fired more easily. The ash also contains some unburnt carbon which helps to fire the bricks and so saves fuel.

It has been shown, however, by experiments at the BRS (which is equipped for pilot-scale brickmaking) that equally satisfactory bricks can be made with 85 per cent ash and only 15 per cent clay. This discovery opens up the possibility of building new brickworks adjacent to power stations and at the cost of transporting relatively small quantities of clay, the troublesome waste product, fly ash, could be turned into bricks for houses.

Another investigation by the BRS has shown an alternative use for the ash. By simply treating it with water in a special machine it can be made into pellets. These are then heated to red heat, the heat once again being largely supplied by the unburnt carbon contained in the ash, and so hardened that they are suitable for mixing with cement to make concrete blocks somewhat like the familiar breeze block. This discovery is important because supplies of the clinker used up to now are dwindling.

Extensions at Bengers

NEW development laboratories just opened by Bengers Ltd. are part of a series of big extensions planned at Holmes Chapel, Cheshire, where men and machines are now busy on a site adjoining the present buildings. These new laboratories covering 6,000 sq. ft. have been needed for the development of the company's steadily increasing range of products for the medical profession and the pharmaceutical industry. They follow the opening, last autumn, of a new stores building of over 20,000 sq. ft.

Next in the list of extensions is a new building of 30,000 sq. ft., on which work has already started. It is planned to open this next year.

'This extension will enable us to reorganise our various sections,' said an official of the company, 'and to keep pace with the expansion of our activities in various fields. It is a far cry from the day in 1883 when Frederick Baden Benger recorded with pride in his diary that orders for one day had totalled £100.'

Although the name Benger has long been associated with the self-digestive food, first made over 80 years ago, the company has, in recent years, developed a number of medicinal and dietetic specialities, in close contact with the medical profession. Among its newer products are Dextraven, a blood expander now used in many British hospitals, and Hyalase, a versatile chemical used in spheres as different as dentistry and obstetrics.

Drilling by Potash Firm

EXPLORATORY drilling operations under prospecting permit are being continued by The Potash Company of America Ltd. at a possible shaft site about 15 miles east of Saskatoon, Canada. The aim is to see whether it is practicable to sink a shaft at this point to reach potash deposits more than 3,000 feet below. Orders have been placed for a surface plant necessary to conduct a freezing operation and the Stearns-Roger Manufacturing Co. will supervise erection. Potash Company of America Ltd. is a wholly-owned subsidiary of Potash Company of America, operating at Carlsbad, New Mexico. The Canadian subsidiary with offices in Saskatoon, has a staff of Canadian and American technicians.

Mercuric Chloride & Starch Hydrolysis

Exhaustive Research Produces Inexplicable Results

IN a long series of experiments which included the most elaborate precautions against the introduction of experimental or personal errors, workers at the Boyd Medical Trust Institute, Glasgow, have produced results which, if substantiated, are very difficult to explain on the basis of our present concepts. Briefly, these results, which are reported in the *British Homœopathic Journal* for January, 1954, suggest that a solution of mercuric chloride, diluted with such a fantastically large amount of water that the chances of discovering a single molecule of the compound in a ton of the solution are several millions to one, is yet still capable of chemical activity.

The reaction which was chosen for study was the enzymatic hydrolysis of starch by malt diastase, previous work having established that at concentrations down to 10^{-6} molar, mercuric chloride behaves as a reaction inhibitor (or negative catalyst), while at dilutions between 10^{-9} and 10^{-14} molar it behaves as a mild stimulant of the reaction rate. The results obtained at these dilutions, however, showed a statistical scattering.

Method of Preparation

The method of preparing these very dilute solutions is that of 'series dilution' in which one drop of a strong solution is added to 5 ml. of distilled water in a weighing bottle, which is then submitted to mechanical shock (succusion) to promote homogeneity. A drop is then removed from the diluted solution and transferred to a further 5 ml. of distilled water in another weighing bottle. When the original mercuric chloride solution (1 in 100) is diluted in this manner, 27 times the resulting 'solution' is still found to have a positive stimulating effect upon starch hydrolysis. The extraordinary nature of this result may be gauged by considering that at a 'dilution' of 10^{-22} the last molecule of mercuric chloride should have disappeared from the solution to leave only distilled water. The 27th stage of dilution (given the index number S.27) has a mathematical dilution of 10^{-61}, a figure which has no significance upon present day chemical theory.

Special technicians were trained to carry out the experimental work which was executed with the most rigid discipline and control. The procedure consisted of the comparison of pairs of flasks, one of which contained starch, diastase and distilled water, and the other starch, diastase and mercuric chloride solution diluted from 27 to 31 times (S.27-S.31). The dilutions have been given the name of microdoses. The comparison between the flasks is made by a Spekker absorptiometer which measures the density of the blue solutions obtained when iodine is added. As the starch is hydrolysed the blue colour fades to purple and then to red, these changes corresponding to chain lengths of 33, 13 to 33, and 7 to 13 glucose units respectively. Dextrins containing 6 or less glucose units do not give a colour with iodine. A green filter was used to isolate that part of the spectrum at which the maximum density change occurred (520 to 540 mμ).

Action Uncertain

The manner in which the enzymatic hydrolysis of starch may be stimulated is uncertain, but heavy metal ions may play a part by the removal of inhibiting groups. The traces of metal ions present in the distilled water (calcium, magnesium and sodium) have been shown to have no effect on starch hydrolysis since they appear in both test and control flasks. Unconscious bias on the part of the operator was eliminated in a series of trials in which the identity of control and test flasks was concealed. The possibility that stimulation might be due to adsorption of mercuric chloride upon the glassware was also eliminated by the controlled interchange of test and control glassware, and the efficiency of cleaning procedures was checked by the use of radioactive mercuric chloride as a tracer. The tracer technique was also used to check the homogeneity of solutions during dilution down to 10^{-9} (the limit of the method).

A spectroscopic examination of the microdose and distilled water showed no significant difference, although it was noticed that the activity of the microdose towards starch hydrolysis decreased with time and was

almost totally lost after 3 months. A statistical analysis gives the strongest possible indication that there is an acceleration in those flasks to which a microdose is added and none in those to which distilled water has been added. The authors of the paper consider that as a microdose contains no perceptible trace of mercuric chloride, and has in fact no detectable character different to distilled water, some other unknown ultramolecular factor is involved. A similar effect has been observed with S.27 microdoses obtained from *Strophanthus sarmentosus*, which has a stimulating effect upon the frog heart. In this case the activity is very difficult to destroy and will survive both boiling and freezing.

Despite the rigid nature of the experimental work which is described, the conclusion is difficult to accept. It is probable that the fallacy lies in the acceptance of the statistical analysis of absorptiometer readings as an indication of some ultramolecular process. It is recalled that similar statistical analyses upon blind guesses of cards dealt at random have given equally strong indication of extra-sensory perception.—J.R.M.

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Pevalon Film

New May & Baker Development

MAY & Baker Ltd. have developed a new coloured polyvinyl alcohol film produced in two designations, Pevalon H.11 and Pevalon H.12. Pevalon is being used in connection with the techniques of moulding and forming re-inforced polyester resins as a mould release agent, as a final laying-up blanket and as a separating sheet in 'rubber-bag' moulding.

Particularly in the H.12 grade, it is also suitable for making water-soluble bags that can be used for packaging pre-dosed components of wet mixes and lamination to paper to provide a grease, oil, or petrol resistant surface.

Both Pevalon H.11 and Pevalon H.12 absorb moisture from the atmosphere in amounts which increase with the humidity of the air. Both films have a high water vapour transmission rate. Pevalon H.11 rapidly dissolves in water at temperatures above 65 ° and remains in solution on cooling. At lower temperatures, Pevalon H.11 softens and dilates but does not readily dissolve. Pevalon H.12 readily dissolves in hot or cold water. Both films are unaffected by most organic solvents, petroleum, greases, and animal and vegetable fats.

Among the few organic compounds which have some solvent action on Pevalon are glycerin, ethylene glycol, some amides and amines. The other physical properties of the film such as tensile strength, elongation at break, and tear strength are all variable with the relative humidity.

Pevalon may be joined to itself or to paper with Pevafix brand adhesives. The best method of applying this liquid adhesive is by feeding it from a wick, whence the flow can be regulated. Joints which are likely to be severely stressed in use may be improved by moderate heat treatment, with a heat-sealing machine or an electric soldering iron. The edges to be joined must be free from oil or grease and care should be taken that neither insufficient nor excessive adhesive be applied. Sealing can be effected by heat alone. The treatment necessary for this depends upon moisture conditions.

Polyvinyl alcohol is not toxic to animals when administered by mouth or applied to the skin. It is recommended, however, that careful tests be carried out to determine any effects on flavour or wholesomeness when it is proposed) to use Pevalon film in direct contact with foods.

G. A. Harvey on Display

MESSRS. G. A. Harvey & Co. (London) Ltd., in conjunction with their agents, The Arab Contracting and Trading Co., Ltd., will be displaying, among other things, at their stand at the British Trade Fair, Baghdad, specimens of perforated metals, woven wire cloth and wirework.

Considerable extensions and improvements have been carried out at Greenwich Metal Works, London, S.E.7, which enables the firm, now in its 81st year to meet the increasing demand for its products. To facilitate the manufacture of heavy industrial equipment, Messrs. Harvey are pushing forward the extensions to their heavy construction and fusion welding shops; it is from this section of their organisation that various types of specially designed plant in welded stainless steel, monel, nickel, clad and mild steels are produced.

German Production Near Capacity

Output Expansion Slowed Down by Lack of Plant

GERMAN chemical sales, including exports, in the first half of 1954, amounted to DM5,900,000,000, a three per cent increase following the 10.5 per cent rise from DM5,170,000,000 to DM5,720,000,000 in the second half of 1953. The official production index for the chemical industry showed a 7.7 per cent increase for the first half of 1954, compared with the preceding six months, but output gains for basic chemicals were mostly smaller: sulphuric acid 3.6 per cent to 821,000 metric tons (SO_3), caustic soda and soda lye 3.2 per cent to 245,500 tons (NaOH), calcium carbide 3.1 per cent to 375,000 tons, chlorine 4.2 per cent to 176,000 tons and soda 4.8 per cent to 462,000 tons ($NaCO_3$).

The pace of output expansion in the chemical industry of the Federal Republic has thus slowed down markedly, a fact which is attributed chiefly to lack of surplus capacity in the basic sections of the industry and the inability of the German capital market to provide the large sums of long-term finance required for additional plant construction on terms acceptable at present price levels. The need for substantial additional investments is constantly stressed by leaders of the German chemical industry, but very large sums have been and are still being invested in the younger sections of the industry where new plant yields bigger financial returns.

Exports Higher

Chemical exports in the first half of this year were nearly 30 per cent higher than in the corresponding period of 1953, and the foreign business has therefore assumed still greater importance for German chemical manufacturers. Nevertheless, dissatisfaction is expressed with the export trade, especially with non-European countries, in view of the fact that chemical products still do not account for more than 13 per cent (in May) of total exports from the Federal Republic, against 17-18 per cent before the war.

Sales of superphosphate, which recovered somewhat more slowly than other fertilisers after the war, appear now to have come into line with those of nitrogen and potash materials. West German superphosphate manufacturers report sales of 320,000 metric tons for the 1953-54 season, a substantial improvement on the preceding year. Potash producers report a further increase in sales for the current year. Larger export orders caused one group to postpone deliveries of potash magnesia to domestic users.

High Foreign Demand

Foreign demand for high-grade potassium chloride and potassium sulphate is stated to continue at a high level which will take charge of the current West German production for many months to come. Substantial shipments are to be made to Japan this month and in September and October. Stocks at works and in export ports were very low at the beginning of the new fertiliser year. Potash production in the first six months of this year amounted to 781,000 tons (K_2O) against 623,000 tons in the corresponding period last year and thus was below sales, which are returned as 859,000 tons compared with 709,000 tons. The increase was largely due to increased exports which amounted for 35 per cent, compared with 29 per cent in the first half of 1953. Potash production in the Federal Republic is maintained at peak level, as a continuation of the favourable market situation is expected.

More natural gas is likely to become available for chemical use under two agreements concluded between the German and Dutch natural gas producers in the Emsland district on the German-Dutch border and between the German natural gas producers, on the one hand, and Chemische Werke Hüls and Ruhrgas AG, on the other. Substantial quantities of natural gas have been supplied to Hüls since 1942, and these deliveries are now to be extended by bringing several more natural gas producers into the arrangement and by the accession on the consumer side of Ruhrgas AG; the latter company is erecting a plant at Drosten for the high-pressure gasification of coal.

The works of Anorgana GmbH, the Bavarian IG Farbenindustrie subsidiary which was not included in earlier arrangements for the dispersal of IG property, will soon be handed over to a private group headed by one of the Bavarian banks. Some

2,500 men are employed at the factory at Gendorf, Upper Bavaria, in the production of ethylene oxide, plastics, agricultural chemicals and sound recording materials. The future owner is credited with the intention of spending several million marks on research.

Technical equipment to the value of $575,000 will be supplied by Farbenfabriken Bayer AG to Fabricas Argentinas de Anilina SA, a new Argentinian company which will engage in the manufacture of dyestuffs for the textile, leather and paper industries. In return for these deliveries and for manufacturing licences and technical services valued at $75,000, the German company will acquire a 45 per cent interest in the Argentinian company, while the majority of the capital will be in the hands of Compania Quimica SA. The new dyestuffs factory will be located at Lomas de Zamorra in the province of Buenos Aires.

The Atlas Powder Co. of Wilmington, USA, is co-operating with Th. Goldschmidt AG of Essen in a new company, Atlas-Goldschmidt GmbH, domiciled at Essen, which will start the large-scale production of emulsifiers about the end of this year. The new company will distribute in Germany surface-active products developed by Atlas Powder in the USA. Experimental quantities of these are already being made in a pilot plant in Germany.

Dorr-Oliver Company Ltd.

The Dorr Company, of Stamford, Connecticut, and Oliver United Filters Inc., of Oakland, California, USA, have announced the execution of an agreement for the merger of the two companies, to become effective on 31 December, if approved by special meetings of the present stockholders of the two companies, to be held in October. The name of the merged company would be Dorr-Oliver Incorporated and Dr. J. V. N. Dorr and Mr. E. L. Oliver would be joint founder chairmen of the new board. For many years The Dorr Company's subsidiaries and representatives in various countries outside the United States, have manufactured and sold Oliver United Filters equipment in addition to marketing Dorr equipment and processes, and these services will continue to be available from the British company, Dorr-Oliver Co. Ltd., Abford House, London, S.W.1.

Industries Being Stifled

Appeal for Higher Tariffs

SOME important Canadian industries are being stifled by tariff policies which are out of tune with present-day conditions, according to Mr. F. G. Raymant, of Du Pont Company of Canada Ltd.

'Two world wars have shown that the free world looks to Canada as a source of equipment and supplies as well as men,' Mr. Raymant said. 'It hardly seems reasonable to expect that we should develop our industrial strength to provide these needs during an emergency, only to stifle it and let it die when the emergency ends. But that is what is happening today.'

Noting that 60 per cent of Canadian exports consist of natural resources in the raw or partially-manufactured state, and more than three-quarters of imports are manufactured products, he declared that Canadians should have the foresight to develop their country in a way that will leave it stronger for each succeeding generation.

'We cannot expect to accomplish this end,' he said, if we permit conditions to develop which will slowly strangle many of our basic manufacturing industries. This, I believe, will be the result if we pursue an inflexible policy opposed to higher tariffs whatever the justification, and whatever the consequence.

Serious Competition

'We have now come to a period when many foreign nations are again producing more manufactured goods than they can use, and we are faced with serious competition from countries whose industries have a much larger market than ours and who, in many cases, pay labour rates that are substantially lower than those in Canada.'

Mr. Raymant said that the tariff situation should be assessed on the basis of world economic conditions, with exchange difficulties and restricted markets, and not in the light of past precedents. He felt that the guiding principle in forming tariff policies should be the long-term improvement of Canada's economy without protecting inefficient producers or promoting industries unsuited to Canadian resources or economic climate.

Production of Expanded Thermoplastics

Recent Patents Describe Improved Methods

EXPANDED thermoplastic materials have wide applications today ranging from microporous materials for battery separators and diaphragms, to artificial chamois skins. However, constant research is necessary to overcome the many obstacles encountered in the production of successful sponge or cellular masses. For example, foamed latex sponge containing quantities of synthetic rubber, even in low proportions, evolves odours which may be regarded as objectionable, and these products often require the use of deodorants. When 50/50 mixtures of 'cold' GRS and natural rubber are blended, odours are readily detected. Recent developments in this field have shown that, if elastomers such as polybutadiene are blended with the latex foam, this synthetic rubber smell is successfully eliminated (BP. 706,962).

Hard cellular materials may be manufactured from pastes comprising volatile solvents such as acetone, dioxane and the lower fatty esters, and thermoplastics such as polyvinyl chloride. At the higher temperatures gels are formed, blowing being effected by using stable agents such as azo-*iso*-butyrodinitrile. The contents after heat treatment in a mould under pressure for 45 minutes are expanded by the usual reduction in pressures, the resulting product being heated on a water bath for half an hour at 60°.

Uniform Cell Structures

The production of polyhedral cells in foam structure is very desirable, because the cells in such instances tend to posses a uniform thickness, conducive to light and mechanically stable products. This moreover contrasts with the products consisting of globular cells, which, by having walls of varying thickness, tend to break down at the weakest surfaces, giving inelastic products. Materials with good characteristics are obtained from PVC, when the latter is rendered homogeneous with tricresyl phosphate, using azo-*iso*-butyro-dinitrile.

To improve the 'snap' and permanent set retention of frothed latex, the vulcanised sponge is sprayed with solutions of alkaline earth salts or hydroxides from nozzles immediately on leaving the curing chamber. The sponge, after absorbing the liquid containing the dissolved salts, passes through a series of squeeze rollers (BP. 707,004).

Coarse structures often result from the collapse of ungelled latex foam, and in order to perfect a fine cellular structure, it is imperative that the gelling operation is effected as soon as possible. By utilising quaternary ammonium bases such as cetyl trimethyl ammonium halides in such amounts that the negative charge on the rubber particles is just neutralised, the gelling time may be substantially reduced (BP. 702,908).

Synthetic Chamois Skins

These materials have been prepared from frothed solutions containing polyvinyl alcohol, formaldehyde and a wetting agent, 95 per cent sulphuric acid acting as a catalyst. The froth is poured into a mould and left to set for 18 hours at 25°. Other developments of interest refer to the manufacture of microporous sheeting from PVC. During the homogenisation stage, i.e., the milling operation, certain blowing agents tend to decompose. Blowing agents prepared by reacting hydrazine with benzil find important applications. They decompose at elevated temperatures, and are especially useful in the production of sheeting, which is required to be heated at 160°, either by stoving or infra-red radiation.

Polybutadiene Foams

Unlike natural rubber and chloroprene, the foams prepared from butadiene-styrene copolymers do not retain good characteristics over a range of temperature. These foams improve, however, when they are modified by the addition of polybutadiene latex, thus improving resiliency at the lower temperatures.

Latex foams have been prepared from ingredients comprising Lotol 5010-C (US Rubber Co.) and polybutadiene, with the usual filler and accelerator ingredients. The foam is poured into a mould, gelled, and then cured in open steam for 30 minutes at 100°. Resiliency figures, obtained from Bashore resiliometer readings on samples compressed from 3.6 cm. to 1.8 cm. at 28°, are given in the table overleaf.

% Lotol	% Polybutadiene	Resiliency
100	—	0.5
90	10	1.5
80	20	3.5
70	30	5.8
60	40	6.9
50	50	10.0

It would be expected that the amount of styrene in a butadiene copolymer would similarly affect the resiliency of the foam—as also would the gel content of the polymer: beyond a certain gel concentration resiliency of foam would naturally be seriously affected. Increases of polybutadiene in such foam mixtures produce a decrease in tensile and elongation values.

It is known that butadiene styrene copolymers obtained at −20° consist of 1,4 additions arranged in *trans* form with respect to the double bond, such linear arrangements contributing to maximum resiliency in any foam mixture into which they can be introduced. It is possible however that such copolymers do not impart the desired tensile strength due to the low degree of gel content, copolymers obtained at the higher temperatures (50°) being more suitable (BP. 705,970).

Sponge rubber compositions having fine and uniform structures which combine strength and resiliency are obtained by using stabilisers such as the sodium polysilicates, the preferred salts having a sodium to silicate ratio of 1:3.22. In such cases nitrous oxide is used as the gasifying agent (BP. 697,142).

Blowing Agents

The careful selection of blowing agents in the production of gas-expanded organoplastics affords the rubber technologist ample fields for investigation. As is generally known, blowing agents can exhibit undesirable characteristics. At decomposition they may liberate substances with staining properties, or compounds which have adverse effects on the vulcanisation of the sponge during the blowing operation. They may release toxic derivatives, as in the case of azo-di-*iso*-butyro-dinitrile, which during the blowing reaction releases tetramethyl succinic acid dinitrile. In other circumstances, the products of decomposition, having limited solubilities in the plastic medium, may 'bloom.' Thus the use of blowing agents requires caution. Aromatic sulphonyl hydrazides have been used successfully, the liberation of nitrogen being governed by the following equation.

$$4\ Ph.SO_2.NH.NH_2 \rightarrow Ph.S.S.Ph + Ph.SO.SO.Ph + 6H_2O + 4N_2$$

The products of decomposition of the above equation have little or no odour and do not stain mouldings; in addition they give sharp and defined products having a fine uniform cell structure (BP. 686,814), and do not affect accelerators.

With PVC, however, it is found that the aromatic sulphonic hydrazides like the oxalate of *bis*-(methyl-iminoamino) disulphide impart mercaptan-like after-smells. This difficulty has been surmounted by incorporating equimolecular proportions of oxalic acid and appropriate amidine derivatives such as dicyandiamide, melamine and 1-amidinoguanazole. These derivatives have been used as blowing agents for the methacrylates, polystyrenes and poly-*iso*butylenes (BP. 695,521).

The formation of fissures and cracks in GR-S latex foam using delayed gelling agents such as sodium silicofluoride is prevented by sequestering the zinc ions which are released by the solution of the zinc oxide in the newly formed hydrofluoric acid. The gelling of the foam is thus retarded; oxalates, phosphates, ferro- and ferricyanides have found applications as sequestering agents (BP. 611,165).

Recovery of Philblack

TRADING profits made by Philblack Ltd., carbon black manufacturers, in the year ending 31 March 1954, were £547,348, compared with a loss of £13,232 previously. The figure is arrived at after charges of £324,133 against £165,504, of which £318,327 (£163,950) is provision for depreciation. Interest absorbs £102,000 instead of £117,920, against which investment income brings in £10,546 (£451), leaving a profit of £455,894, compared with a previous deficit of £117,469.

A debit balance of £315,040 brought in is increased to £437,049 with the addition of Note premiums, issue expenses, etc., and £50,000 tax, resulting in a credit balance of £18,845 being carried forward.

It is stated that sales increased steadily but the profit is considerably higher than it would normally be because of the temporary reduction in the rate of royalties payable and substantial tax reliefs. There is no tax liability for the year of assessment 1954-55 owing to initial allowances and losses brought forward, but tax relief arising from initial allowances is estimated at about £250,000 to date.

Safety Precautions in Chemical Laboratories

THERE is always an element of risk in chemical laboratories. In a research laboratory where compounds are often prepared on quite a large scale, and where it is not uncommon for new chemicals and reactions with previously unknown results to be under investigation, a moment's carelessness may result in personal injury and extensive material damage. In establishments where only small-scale work or routine analytical procedures are carried out the hazard may be less serious, but it should never be ignored.

In the laboratory, as in the factory, the basic principles of accident prevention are good housekeeping and a 'safety minded' staff. No code of regulations can relieve chemists of the responsibility of observing due care and precautions in carrying out their duties. Newcomers to the laboratory require to learn that reactions carried out casually at school with negligible quantities of chemicals must be approached in a very different spirit when the scale of operations is appreciably larger. They should be trained from the start to observe certain fundamental rules, which experience has shown to be expedient.

Caution Imperative

Everything in a chemical laboratory should be regarded as potentially dangerous unless it is known to be perfectly harmless. Certain chemicals are always treated with caution because they cause serious burns in contact with the skin, but others which give no such warning sensation may be still more dangerous. Furthermore, hazards are by no means confined to corrosive and otherwise toxic chemicals, but are also associated with the handling of even the most simple chemical apparatus. Serious injury has often been caused by carelessness in carrying out such a simple operation as putting a glass tube into a cork or a rubber bung.

Most accidents in the laboratory are avoidable. Before any experiment is begun, consideration should be given to the precautions necessary to ensure that it is carried out with the highest possible degree of safety. Since emergencies call for rapid action, it is also advisable to consider what measures might require to be taken should anything go wrong.

A common cause of accidents is slipshod assembly of apparatus, which is often the result of undue haste to get results. Laboratory workers should never be in too much of a hurry to make quite certain that every item of equipment is in sound condition and that it is of the right size for the purpose for which it is to be employed. There can be no justification for such unnecessary hazards as bungs which do not fit tightly enough, flasks with visible flaws, or condensers which are not quite wide enough in bore.

Overcrowding Dangerous

Experiments should never be carried out at a bench which is already crowded with apparatus. Should the unexpected happen, it will happen quickly, and there will probably be no time to find out which bottles contain inflammable chemicals.

While engaged on any work in which dangerous chemicals are involved, a chemist should never allow his attention to be distracted from the operation he is performing. The consequences of trying to do two things at once may well be disastrous, if one of them happens to be pouring concentrated acid. If a worker is interrupted while doing anything which is potentially dangerous, he should either finish what he is engaged on before replying or suspend operations immediately until he is again in a position to give his whole mind to the operation.

In general, it is inadvisable for an operator to work alone in a chemical laboratory after working hours. It is essential that floors should be unobstructed. A stumble is liable to have serious consequences, not only because of the presence of corrosive chemicals, but also because any chemical being carried by the person who stumbles will probably be in a glass container. For the same reason water or chemicals spilled on the floor should be mopped up immediately. If a corrosive chemical is spilled,

Industrial Safety

directions for cleaning up should be obtained from the senior chemist in the laboratory.

Although its properties are familiar to all laboratory workers, sulphuric acid is still one of the most common causes of accidents. When used as a drying agent, usually in a desiccator or bubbler, its presence is apt to be forgotten, resulting in accidents while cleaning apparatus or clearing breakages. Acid splashes should always be washed off with water before neutralisation with sodium bicarbonate solution is atttempted.

Corrosive Materials

Apparatus containing corrosive materials —particularly sulphuric acid, oleum, alkalis, nitric acid and phenols—should never be left at the sinks to be washed. The vessels should always be rinsed out before being left. Acids and similar materials should not be stored on high shelves. To avoid the consequences of breaking one bottle against another, strong acids should never be stored on the same shelves as strong alkalis. Corrosive chemicals should not be handled in large fragile containers unless another receptacle is provided to carry the contents should the container collapse.

Many safety measures in laboratories are largely a matter of commonsense. Glassware, for example, should always be treated with respect. Tubing or rod should be handled with the precautions which experience has shown to be advisable. In using pipettes care should be taken to ensure that no liquid is drawn into the mouth. Corrosive liquids should never be pipetted. Inflammable liquids in quantities exceeding a litre should on no account be transferred from one vessel to another in a room where there is a flame or an electric heater.

Good housekeeping is of prime importance. Cracked, badly chipped or otherwise dangerous glassware should either be sent to the glassblower for repair or thrown away, depending on the extent of the damage. A special receptacle should be provided for broken glassware, which should not be replaced in a cupboard or thrown into a receptable provided for general rubbish or waste paper. Sinks should be unencumbered by dirty apparatus.

All bottles should be clearly and permanently labelled. Any materials found in bottles which cannot be positively identified should be disposed of carefully and separately.

Rubber tubing and bungs should be kept in good condition, and away from tar products, oils, and other organic chemicals which have a deleterious effect on rubber equipment. Where this is impracticable, equipment manufactured from oil-resisting polymers such as polyvinyl chloride should be used. Gas tubing should be inspected regularly and should be replaced as soon as it shows any signs of cracking or becoming hard.

Fire is probably the greatest hazard in laboratories. Many fires are caused by smoking, which should be avoided in the presence of inflammable solvents or vapours. The careless disposal of matches or cigarette ends is another very common cause of accidents. Flint lighters are preferable to matches for lighting gas fires.

Good housekeeping can do much to prevent small fires from developing into big ones. Combustible materials and inflammable solvents should not be kept in a laboratory in larger quantities than are required for immediate use. They should be returned to their shelves immediately after use, any spillage being immediately wiped up.

Waste Disposal

Different types of residues and wastes should be segregated and placed in separate covered containers. Waste containers should be emptied at the end of each day's work.

All members of the laboratory staff should be familiar with the various types of fire extinguishers available. They should know where each one is located and for what type of fire it should be used. They should also be familiar with the location of main control valves and switches for each of the services.

Most electrical equipment is made as shock-proof as possible by the makers, but the risk of shock in handling electrical wiring, connections or equipment can never be entirely eliminated. No apparatus should be touched with damp hands or when standing on a damp surface. The majority of electrical hazards arise from slipshod assemblies, makeshift connections and high voltages. Connections between apparatus and three-pin power plugs should be made with

10 ampere, three core, rubber covered cab type cable and the apparatus should be earthed by the third wire. All other wiring should be carried out with single or twin rubber covered cable. Connections to ovens, furnaces and other apparatus working at high temperatures call for asbestos covered wire. Porcelain or bakelite connectors should be used to make all loose or temporary connections. Old or threadbare wire should never be used in an assembly. Before any apparatus is moved, adjusted or inspected, it should always be switched off.

Goggles should be provided in every laboratory and should be worn for any operation presenting a potential hazard to the worker's eyes. This protection is particularly desirable in the presence of bromine or volatile bromine compounds, strong ammonia, maleic anhydride, phthalic anhydride, any irritating dust, acids and alkalis, acid chlorides and phosphorus and silicon chlorides. Goggles should also be worn when making fusions or cutting sodium, breaking up solidified melts, chipping any hard material, opening cylinders containing gas under pressure, using grinding apparatus, or when carrying out any operation with a danger of liquid splashing.

Avoiding Dermatitis

The care of the hands is primarily a matter of personal cleanliness and the copious use of soap and hot water. While oils, petrol, benzene, acetone and other organic solvents will readily remove certain stains from the hands, they are liable to promote excessive dryness of the skin, a condition which is particularly favourable to dermatitis infections. Hands should never be dipped in any chemical solution, however weak. Ladles or stirring rods should always be employed, the handles being long enough to keep the worker's hands well away from risk. Similarly, some form of scoop should invariably be used for handling powders or other solids. Workers who are advised to wear protective gloves or to apply a protective barrier substance should do so strictly in accordance with the instructions of the senior chemist.

As a safeguard against dermatitis, all cuts or skin injuries should be given first aid treatment and any faint rash or skin irritation should be reported immediately.

Special precautions are, of course, necessary when dealing with highly toxic, inflammable or explosive substances, or in carrying out such potentially hazardous operations as solvent extractions and vacuum distillations. To a large extent, however, safe practice in the laboratory is a matter of care and commonsense in performing a multitude of familiar tasks. Yet failure to take elementary precautions when performing routine operations is a frequent source of minor injuries and sometimes has serious consequences. The basic requirement of accident prevention, therefore, is that newcomers should be under close supervision by senior members of the laboratory staff until they have become thoroughly conversant with safety principles.

Industrial Safety

A Safety Textbook

Experienced chemists, who were themselves adequately supervised when junior workers, may have become so accustomed to working safely, that they fail to realise all the foolish ways in which a simple operation can be carried out. There is thus a need for a simple and concise textbook which can be used by a practical safety guide. This requirement was met some five years ago by 'Safety Measures in Chemical Laboratories,' a pamphlet based on the accumulated experience of chemists of long service at the Chemical Research Laboratory. Though compiled primarily for the guidance of new entrants to the Chemical Research Laboratory, it was published for the Department of Scientific and Industrial Research by HMSO, in order that it might be available to all chemists.

In the type of general safety organisation established at the Chemical Research Laboratory, Sectional Safety Officers are responsible to the Laboratory Safety Officer for the periodical inspection, maintenance or renewal of protective equipment issued to the sections. They are also responsible for maintenance in good order and readiness of all fire fighting equipment, unless a trained volunteer fire brigade can take over this specialised duty for the whole of the laboratory.

Since the danger of personal injury is always present in a chemical laboratory, it is considered imperative that a large proportion of the staff should be trained to

Industrial Safety

render first aid. In addition to a central store of first aid equipment, subsidiary small cabinets are distributed throughout the laboratory, each one being in the charge of an officer or officers qualified to render first aid to the injured. Each of these officers holds a key to the main first aid room; in addition, an emergency key is kept in a glass box affixed to the door of the first aid room.

The recommendations for action in the event of an accident are that any obvious measures, such as extinguishing fires or dealing with corrosive materials, should at once be taken. If there is personal injury, expert assistance should be obtained without delay. Afterwards, a member of the accident staff is notified and full details are given to the head of section, while still fresh in mind. Emphasis is placed on the importance of reporting any accidents in which injury is narrowly averted, in order that precautions can be decided upon to avoid repetition. Members of the staff are also asked to assist by notifying any operation or piece of apparatus which they consider even potentially dangerous.

US Toxicology Tests

TESTS to reveal the very early physiological changes caused by the action of chemicals are being undertaken at the Haskell Laboratory for Toxicology and Industrial Medicine, near Washington, USA. The laboratory was established by Du Pont in 1935 and recently the company dedicated a new $2,000,000 building to intensify research.

The toxicology tests, described in *Chemical and Engineering News*, are usually started by finding out how much of the test material, given by mouth or inhalation, it takes to kill white rats. Then each of six rats is given a daily dose equal to one-fifth of the fatal dose until ten treatments have been given. If the rats all survive, show no signs of illness and grow normally, the material is evidently destroyed or eliminated promptly from the body. If there is evidence of cumulative toxicity, it may be run down by more elaborate tests.

Feeding tests lasting for two years—the normal life of the white laboratory rat—are carried out for chemicals which may get into food accidentally, like insecticide residues, or intentionally, like stabilisers for food fats. The laboratory also runs inhalation tests, to determine what air concentration can be breathed without harm, skin toxicity tests and eye tests, to determine the potentiality of a chemical to produce serious eye injury or blindness.

Industrial Disease in July

A TOTAL of 35 cases of industrial disease, none of them fatal, were reported under the Factories Act, 1937, or the Lead Paint (Protection against Poisoning) Act, 1926, during July. There were four cases of lead poisoning, half of them in electric accumulator works, and ten people engaged in the manufacture of bichromates were effected by chrome ulceration. There was one case of aniline poisoning. During the month, four fatal accidents were reported from factories making chemicals, oils and soap, etc.

Blaze at Match Factory

SMOKE from chemicals hindered firemen who tackled a blaze that destroyed a West Hartlepool factory owned by the North of England Match Company on Monday night. The fire started in a fan, spread to a tank of wax and then to woodwork and machinery. Millions of matches burst into flames when it reached the bonded store, and during the evening there were two explosions. One worker was overcome by fumes and detained in hospital.

Firemen from thirteen brigades fought the outbreak for four hours; three tugs equipped with fire-fighting apparatus pumped water at the flames from a nearby dock. Small fires started in the plastic materials used to cover the guns of ships of the Reserve Fleet lying in the dock. They were dealt with by the crews and watchmen.

Temporary Reprieve

The Minister of Housing and Local Government has written to the local authorities in the Forest of Dean and told them that the Atomic Energy Authority will not dispose of any wastes in disused mines in the forest until the local authorities have had a further opportunity to discuss and consider the proposals.

Solution of a Problem

Stress-Relieving a Large Welded Pressure Vessel

THE problem of stress-relieving the central weld of a high-pressure oil fractionating column is described in report No. 566/53 of the Industrial Development Committee of the Gas Council (Information supplied by the East Midlands Gas Board) from which the following description is taken.

The column, 120 ft. in length and 3 ft. 8 in. in diameter (Fig. 1) had been initially fabricated in two 60 ft. sections, each section being separately stress-relieved in a furnace. The two sections were then aligned for the final central weld at the works of a local chemical engineering firm. As there was no available furnace large enough to take the whole of the completed column, it was agreed that if this final weld was stress-relieved on site to a pre-determined heat treatment specification, the column would be accepted by the oil company's inspecting engineer. This called for a temporary furnace setting local to the weld.

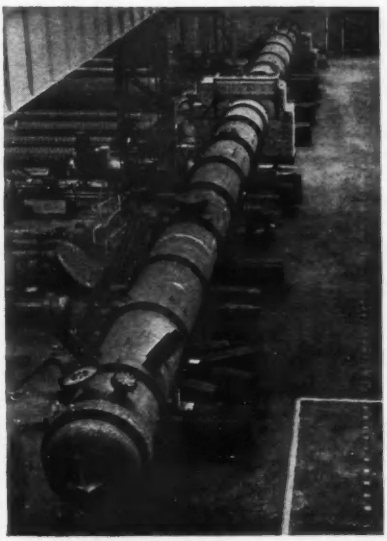


Fig. I

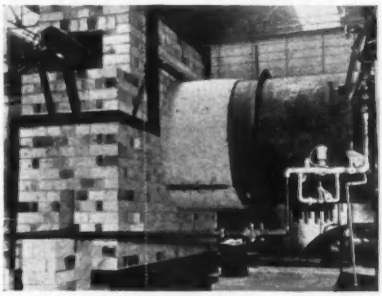


Fig. II

The conditions required for heat treatment were taken from a code of practice, issued jointly by the American Petroleum Institute and the American Society of Mechanical Engineers in 1943, relating to the heat treatment of pressure vessels. The code, in abstract, is: the temperature gradient on either side of the furnace and along the heated portion of the shell not to exceed 200° F per foot; the temperature difference throughout the portion of the shell being heated not to exceed 150° F; the rate of heating above 600° F not to exceed 400° F per hour; the rate of cooling not to exceed 500° F per hour.

The process for which the column was designed necessitated careful heat treatment, calling for an even temperature around the welded section and a close control of that temperature. A furnace was therefore built to the design shown in Figs. I, II, III and IV.

A brickwork duct was built around the lower half of the vessel, the construction being such that a rectangular combustion chamber was formed with an offtake into the duct, and a flue arranged at low level to relieve any excess pressure in the furnace. The upper half consisted of a sheet-steel duct which rested on, and was sealed to, the lower brickwork. This duct was then covered with brickwork to form the finished structure, as shown in Fig. II.

With a view to maintaining the required temperature gradient along the column, a ring of low temperature insulating bricks 3 in. thick was placed against the interior

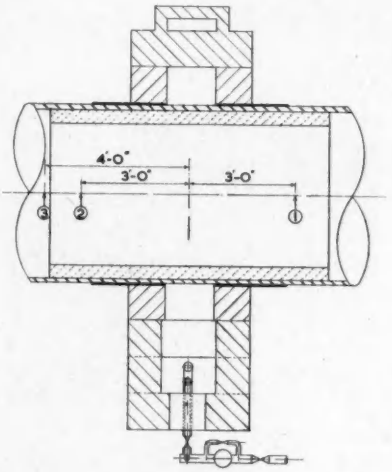


Fig. III

surface for a total length of about 6 ft., and a spillage of hot gases from the heating chamber was allowed to flow along the exterior surface of the vessel for a distance of some 2 ft. on each side of the main chamber in an annulus created by the fitting of lagged steel-sheet covers held away from the shell by ¼ in. distance pieces.

The portion to be heated was a circumferential strip 15 in. wide, and in the method adopted the hot gases were drawn from the top of the combustion chamber into the inlet side of the high-speed axial-type fan and circulated at high velocity around the annular space between the exposed shell surface and the ducting. It was essential in this design to have the fan blades and a portion of the shaft in the flow of the hot-gas stream. In order to avoid any possibility of overheating the independent fractional-horsepower motor, it was proposed to employ a vee-rope drive and to water cool the hollow fan shaft and the shaft bearings. In practice, however, the fan shaft was solid and driven direct by a motor through insulated couplings. This was not entirely satisfactory, as the conducted heat affected both the bearings and the motor during the course of the tests.

The burner equipment consisted of two 'Hypact' burners, Nos. 600 and 400, each separately controlled by a quadrant cock and fed from a common gas-supply pipe which carried the control equipment. The gas was fed to the burners through a constant-pressure governor and a solenoid valve, the latter being by-passed with a small valve in the by-pass pipe for adjustment purposes (Figs. II, III and IV). The solenoid valve was operated from the electricity mains through a temperature indicator/controller, and the controlling thermocouple was sited in the hot-gas stream at its first point of contact with the vessel.

In order to assess the average temperature of the heated section, it was felt necessary to obtain further temperature recordings both around the weld and along the vessel away from the weld. For this pur-

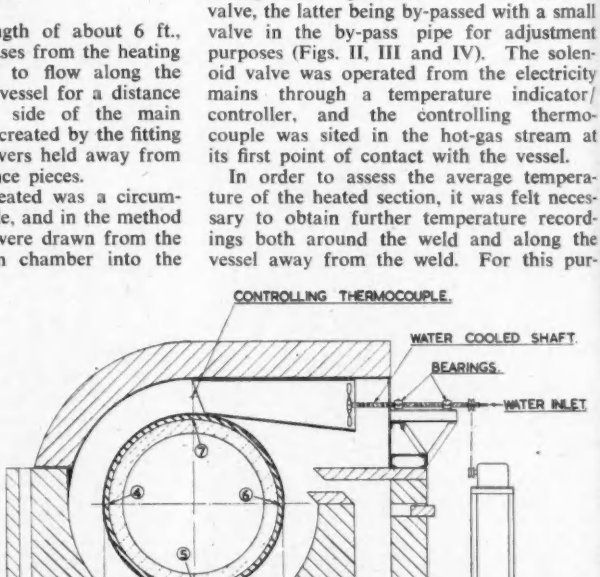


Fig. IV, showing sectional elevation through the centre. Fig. III shows the sectional plan through the centre

pose four thermocouples (Nos. 4, 5, 6 and 7, shown in Fig. IV) were sited on the inner surface of the vessel around the weld. A further three thermocouples (Nos. 1, 2 and 3, shown in Fig. III) were sited at appropriate points along the inner surface of the vessel away from the weld. In order to determine the rate of temperature rise, No. 7 'couple' was connected to a temperature recorder, and half-hourly readings of the remaining 'couples' were taken by means of a potentiometer which was also used to check the recorder.

As rapid heating was not essential, it was decided to avoid any possible local strains due to expansion by bringing up the temperature slowly. This was done by running the No. 400 burner until the temperature rise commenced to slow down, then changing over to the No. 600 burner, and finally running both burners full-on against control by operation of the solenoid valve from the temperature controller. The whole cycle was carried out to the satisfaction of the inspecting engineer, and the completed column was accepted by him.

The gas consumption over the total heating cycle was approximately 20,000 cu. ft. (100 therms). This was considered reasonable in view of the size of the vessel and the nature of the heat treatment involved.

Safety Notebook

WHEN fire broke out recently in the premises of McArthur & Jackson, oil refiners, 98 Dobbie's Loan, Glasgow, a workman employed as a varnish mixer, was enveloped by the flames which were leaping from a tank of bituminous solution which had caught fire. He managed to stagger from the blaze, and was taken to the Royal Infirmary, Glasgow, but was allowed home after treatment.

Several workers tackled the blaze. Fortunately, there was a safety device on the tank, which caused the lid to close and smothered the centre of the fire. The workers were able to extinguish the fire before the arrival of the fire brigade.

* * *

A RANGE of modern fire fighting appliances, motor vehicle bumpers and metal-finishing processes which are in use in the motor vehicle industry will be featured by The Pyrene Co. Ltd. on Stand No. 393 at the Commercial Motor Show, Earls Court, from 24 September to 2 October.

The fire appliances to be displayed have been designed to meet the many risks that affect all classes of motor vehicles, garages, service stations, administration buildings and showrooms. The fastest of all fire fighters—the 'Pyrene' Dry Chemical fire extinguisher—will also be displayed. This appliance is capable of extinguishing dangerous, highly inflammable fires in a few seconds and is now widely used to provide immediate fire fighting action wherever oils, spirits, alcohols and solvents are stored or used.

To meet the particular hazards of fires involving such metals as sodium, calcium, magnesium and aluminium, there is the recently developed 'Pyromet' Dry Chemical extinguisher. The special extinguishing medium used by this appliance is discharged lightly by a special applicator, thus avoiding the likelihood of scattering.

* * *

VISITS to the I.C.I. works at Billingham and Wilton will be the chief features of the Association of British Chemical Manufacturers' Chemical Works Safety Conference at Harrogate from 5 to 7 November. Delegates will be divided into four groups, two to visit each works in turn. Two groups will see at Wilton the olefine plant, ethylene oxide plant and glycol plant and, at Billingham, the boiler and power plant, ammonia plant and ammonia oxidation plant. The other two groups will see the hydrogen compression plant, formaldehyde plant and workshops and power station at Wilton and the hydrogenation (petrol) plant, ammonium phosphate plant and 'Nitro-Chalk' plant at Billingham.

The conference fee is £2 10s. The provisional programme contains the warning:

Safety Notebook

'There will be a considerable amount of walking in the works visits, and much of it will be out of doors. Suitable clothing for the North-East coast in November should be worn.'

* * *

TO mark the completion of 600,000 accident-free hours of work, the 500 men of Billingham I.C.I. Research Works recently received a £20 award for their social activities group, it was reported in last month's *Tees-side Journal of Commerce*.

The award was made under an incentive bonus scheme introduced about seven months ago as part of the inter-works safety competition. Under it, works or sections receive £10 for 200,000 accident-free hours, an additional £15 for 400,000 hours, £20 at 600,000 hours, £25 at 800,000 hours and £30 at 1,000,000 hours, so that a total of £100 can be won.

The company's aim is to reduce the accident frequency rate at Billingham—at present about one for every 100,000 hours worked—by 50 per cent. Eight sections have already received awards for 200,000 accident-free hours and three others for 400,000 hours.

* * *

LENSES made of 'Optilite,' a specially compounded, non-inflammable plastic of high safety qualities, are features of the SAF-I-FLEX goggle and the SAF-I-SPEC, both made by Parmelee (GB) Ltd., of Slough.



The SAF-I-FLEX Goggle

The goggle weighs only 2 oz. and combines complete protection for the eyes with ventilation—to eliminate fogging—through the frame. Special features of the spectacle-type SAF-I-SPEC are a soft polythene nose bridge and a simple 'one-screw' lock of temples to lens. It can also be obtained with eye-shields.

* * *

GUIDANCE to licensing authorities and all those concerned with the storage and handling of calcium carbide is given in the second (revised) edition of a booklet 'The Storage of Calcium Carbide' published by The British Acetylene Association. The first edition, which appeared in 1930, is now out of print. In the new edition, revisions have been made, and a section has been added dealing with the regulations for the transport of calcium carbide.

Only very small quantities of the solid may be kept without a licence, but the Petroleum (Consolidation) Acts, 1928 and 1936 lay down no conditions to be attached to the licence. The booklet suggests suitable conditions, the chief of which are that the store should be kept dry and thoroughly ventilated and due precautions taken to prevent access of water. It is also suggested among other things that the quantity of calcium carbide exposed to the atmosphere at any one time should be kept to the minimum possible, and that the use in the store of copper or alloys containing a higher percentage of copper should be avoided.

First-aid measures, in case calcium carbide comes in contact with the eyes, are also given. The booklet, which costs 4s. 6d. and is obtainable from the offices of the association, details the legislation relating to storage.

* * *

AN action at Leeds Assizes in March, alleging breach of the Protection of Eyes Regulations, 1938, made by the Home Secretary in pursuance of Section 49 of the Factories Act, 1937, is described by a barrister in a recent issue of *The British Manufacturer*. The case was Whalley v. Briggs Motor Bodies Ltd., and the plaintiff was employed as a skilled labourer by a man called Hanson, who had a contract from Briggs Motors to make fresh bed plates for a large part of their Doncaster works.

This meant the breaking up of old con-

crete by means of a pneumatic drill, which was Hanson's property. 'It seems,' says the writer, 'that Whalley had more than once asked his own employer if he could be supplied with goggles, but nothing was done about it, and they were not forthcoming. At all events, what might have been expected occurred. Some chips of concrete flew up, in July, 1947, and lodged in one of Whalley's eyes. Eventually it had to be removed, for fear of total vision being jeopardised.'

Section 49 of the Act refers to 'special risks' involved in a 'process' and provides that goggles or other 'effective screens' should be supplied by the employers. But in his judgment, Mr. Justice Streatfield ruled that the 'processes' referred to meant some operation carried on by the factory occupier. 'Persons employed' by that process meant employees of the resident manufacturers, not of an outside contractor engaged on a single specific job. In this case the process was not one carried on by the manufacturers themselves, as occupiers, nor was the plaintiff ever their own employee; in fact, he had chosen the wrong defendants.

It was also held that Whalley was using an 'implement moved by mechanical power' provided or supplied by his own employer, so Hanson was deemed to be the occupier of the factory in this instance. The Judge also held that Whalley's remedy under the Act was barred by Section 30, because he had admitted receiving certain sums from Hanson by way of interim compensation, and judgment was given for the defendants. So far there has been no appeal although the possibility cannot be ruled out.

* * *

Safety Notebook

THE American coke-manufacturing industry established a new safety record during 1953, according to a recently issued statement from the Bureau of Mines, United States Department of the Interior. Both the combined death and disabling-injury rates for the industry as a whole were lower than ever before reported, and the total number of injuries, fatal and non-fatal, was the lowest recorded in any year since 1939 and the sixth lowest annual total since complete records for the industry were first made available in 1916.

From reports submitted to the Bureau on 27,301 active coke ovens, the combined frequency rates, fatal and non-fatal, were 6.69 injuries per 1,000,000 man-hours of worktime or exposure and 5.14 injuries per 1,000,000 net tons of the product manufactured. Each rate, a sharp improvement over its respective rate of 8.82 and 7.59 in 1952, was affected by a 22 per cent reduction in the number of injuries, a 3 per cent increase in man-hours of worktime, and a 15 per cent increase in production. Although the number of men employed daily in the industry dropped 7 per cent to an average of 23,440 in 1953, the coke plants were active 30 days more than they were in 1952.



On behalf of the employees of Union Carbide and Carbon Corporation, Morse G. Dial, UCC's president (left) is shown accepting the Award of Honor for UCC's accomplishments in safety during 1953, from Ned Dearborn, president of The National Safety Council. The award is made for improvement in frequency and severity rates below par rates established by the Council. During 1953, the accident frequency rate for UCC employees was 3.6 disabling injuries per million man-hours worked. This is 73 per cent below the similar rate for all United States industries

HOME

Change of Trade Name

'Voltastat' having a similarity to a trade name used by another electrical manufacturer, Winston Electronics Ltd., Hampton Hill, Middlesex, have discontinued its use. Instead, 'Constavolt' will be used when the stabilised voltage control equipment is designed for battery charging, etc., and 'Magnetrol' when used for rectification, battery elimination and similar purposes.

Dewsbury Blaze

Firemen extinguished an outbreak of fire at the carbon bi-sulphide plant of J. Brown & Co. Ltd., manufacturing chemists, Savile Town, Dewsbury, after employees who had tried to deal with the blaze had been driven back by fumes and flames.

Benzole Price Changes

The National Benzole Co. Ltd. announce changes in the prices of pure and 90's benzole in order to cover increased refining costs. The changes, which came into effect on 1 September, are as follows:—Bulk, minimum lots 200 gal., pure benzole, 5s. 4d., 90's benzole, 5s.; 50 gal. barrel, minimum lots of four, 5s. 8d. and 5s. 4d.; 50-gal. barrels, less than four, 5s. 10d. and 5s. 6d.; 5/10-gal. drums, 2-gal. cans, 6s. 1½d. and 5s. 9½d.

Two Hurt in Explosion

Two men were slightly hurt in an explosion last week in a glycerine nitrating house at the Ardeer Works, near Irvine, Ayrshire, of the I.C.I. Nobel Division. James Neil, of Hillside Street, Stevenston, Ayrshire, who was outside the building, was hurled aside by blast and another Stevenston man, W. Farrell, was injured. Other workers were treated for shock.

Anglo-Iranian in Scotland

Visitors to the stand of Scottish Oils Ltd., a subsidiary of the Anglo-Iranian Oil Co. Ltd., at the Scottish Industries Exhibition, Kelvin Hall, Glasgow, will be able to see the progress made in the oil industry since Dr. James Young, a Glasgow chemist, patented a process for obtaining oil from coal, 100 years ago, and later from shale. The activities of Anglo-Iranian in Scotland are shown by means of models and photographic murals and there is a diorama of the company's newly-opened Aden refinery.

Institute of Metal Finishing

The opening meeting of the 30th session of the Midland branch of the Institute of Metal Finishing is to be held on Tuesday at the James Watt Memorial Institute, Great Charles Street, Birmingham 3. The Scottish branch will open on Wednesday at the Institution of Engineers and Shipbuilders in Scotland, 29 Elmbank Crescent, Glasgow. Other branches are to hold their opening meetings later in the month, with the exception of the North West branch, which began on 2 September.

New Premises for Glasgow Firm

Scientific Instruments (Glasgow) Ltd., of 1293 Argyle Street, Glasgow, are planning a move in the near future to a new factory to separate their manufacturing activities from their repair and maintenance work. Manufacturing work will be transferred to the new premises which are in process of development. Intention is to develop a range of new instruments aimed at the paper, textile, chemical and allied industries, and to batch produce these at the new plant. The existing premises will be used to repair and maintain plant in these fields and to undertake general scientific instrument repair work. The company was formerly Scottish Scientific Instruments of the same address. The new company which has taken over, has as its directors, Messrs. C. H. Drewell, I. H. Duncan, A. O. Eyles and K. Apold.

Professor West at Belfast

Professor Philip W. West, Ph.D., will read a paper entitled 'Spot Test Methods of Analysis' at the first meeting of the 1954-55 session of the Belfast and District Section of the Royal Institute of Chemistry, jointly with the Chemical Society and the Society of Chemical Industry. The meeting in the lecture theatre, Department of Chemistry, Queen's University, Belfast, is to be held on Monday evening, 6 September.

Change of Address

The address of the Sheffield office of Birlec Ltd. has been changed to 317 Glossop Road, Sheffield 10. Tel: Sheffield 63258-9.

· OVERSEAS ·

Nickel Production

The first nickel metal was discharged from the autoclaves at Sherritt Gordon Mines plant at Fort Saskatchewan, Alberta, recently. Peak production, it is expected, will be reached in the autumn. Ammonium sulphate production has also started.

New Company for Pennsalt

A new chemical company has taken over the Pennsalt metal cleaner business of Canadian Industries Ltd. Pennsalt Chemicals of Canada Ltd. has been formed with headquarters in Hamilton, to carry on the former CIL line. The company is a division of the Pennsylvania Salt Manufacturing Co., Philadelphia. Long-range plans are said to include installation of a blending plant, where Pennsalt cleaners as well as the phosphatising chemicals 'Fosbond' and 'Foscoat' would be produced. Manager of the new organisation is Mr. W. B. Billingsley, formerly of CIL.

Sugar Factories for Israel

Equipment worth DM. 4,000,000 for a sugar factory now being constructed at Afula in Israel has been ordered in Germany under the Reparations Agreement. It is hoped to complete the factory within one year. At a recent meeting between Mr. Givati, Director-General of the Israeli Ministry of Agriculture, and members of the Southern District Council, a plan to set up a sugar factory in the south of Israel was considered. Mr. Givati announced that the factory would be set up when the Afula factory is completed.

Aluminium Ingot Production

The Australian Aluminium Commission will begin production of the ingot metal at Bell Bay, Tasmania, early next year. The project is sponsored by the Australian Government and will cost £A10,500,000. By 1955 the plant should be close to full output. The project is the only one of its kind in the Southern Hemisphere. The Commission obtained technical personnel from the British Aluminium Company. It has proved the existence of adequate local resources of bauxite, and has reserved them for national purposes. Because these resources cannot be developed for some time it will begin operations at Bell Bay with imported bauxite.

Greek Mineral Output Up

Output of minerals in Greece may soon exceed the pre-war level; it is already approaching it. Bauxite production in 1953 was 328,241 tons, compared with the 1938 figure of 179,888 tons. Iron ore output, however, has not yet reached the 1938 figure of 348,613 tons.

Canadian Company Changes Name

Mr. Leo E. Ryan, president of Barringham Rubber & Plastics Ltd. has announced in Montreal that the company name has been changed to Monsanto Oakville Ltd. Monsanto Oakville operates as a subsidiary company of Monsanto Canada Ltd., Montreal, and manufactures vinyl film, sheeting and coated fabrics. The parent company manufactures a wide range of chemicals and plastics.

Factory in Jamaica

G. A. Willis (Middlesbrough) Ltd., paint, varnish and enamel manufacturers, Aycliffe, Co. Durham, have opened a factory in Jamaica in conjunction with the Industrial Development Corporation. The Jamaica works are managed by Lieut.-Col. H. C. R. Laslett, while Mr. H. A. R. Thurlow is technical director. The new factory has been granted 'pioneer status' which will enable it to operate tax-free for 10 years.

Sindri Fertiliser Factory

The Sindri fertiliser factory in India has turned out nearly 600,000 tons of fertilisers since it went into production some 32 months ago. This has resulted in a saving of about Rs.180,000,000 in foreign exchange. Sindri's new coke plant is expected to go into production shortly. Work on the cement factory will be completed in the second half of 1955.

US Titanium Production

Although domestic titanium production in the US in 1953 was more than twice that of 1952, the supply was inadequate to meet reported military demand. A special Senate sub-committee that conducted hearings to study the various phases of the titanium industry recommended an increased production goal for titanium and the awarding of additional government production contracts without delay to qualified concerns contributing towards this goal.

PERSONAL

MR. JAMES WOODHOUSE, Assistant Divisional Marketing Officer (Coke), of the National Coal Board, has accepted the post of commercial manager of Monckton Coke & Chemical Co. Ltd., near Barnsley. Mr. Woodhouse was at one time sales manager of Nunnery Colliery Co. Ltd., Sheffield, as well as a director of the Rotherham Collieries Association Ltd. and the Coke Producers' Federation.

MR. C. A. F. HASTILOW has joined the board of Southalls (Birmingham) and has agreed to act as chairman. He succeeds MR. J. I. M. BARCLAY, who has resigned as chairman and managing director on medical advice. Mr. Barclay will, however, remain on the board and act in an advisory capacity to his successors. Mr. Hastilow is a director of Pinchin Johnson and Associates and chairman of Docker Brothers, one of the companies in that group. MR. E. H. BOAS has been appointed managing director of Southalls. He has been the chief administrative officer and a director of Courtaulds (Textile Division).

MR. VINCENT G. S. COTES has resigned from the board of British Glues & Chemicals. He has also resigned his executive position with the company and will be giving more time to his other interests.

To provide the greatly-increased production capacity necessary in meeting the demand for nickel-containing alloys, British Driver-Harris Co. Ltd. have been carrying out a programme of extension of works and plant and of laboratory and research facilities. The original programme, although of generous proportions, is having to be enlarged, and information about further extensions is expected soon. In addition, a reorganisation at top executive level has become necessary because of the increased management responsibilities. In a message from MR. R. M. PARRY, managing director of the company, the following appointments are announced: general manager (Cheadle Works), MR. ARTHUR CLARK; works manager, MR. JOHN H. IRELAND; assistant works manager, MR. JOHN L. COOPER; foundry manager, MR. HARRY MCLEAVY.

PROFESSOR PHILIP W. WEST, Ph.D., who read a paper at the second symposium on Analytical Chemistry organised by the Midlands Society for Analytical Chemistry at Birmingham last week, and is also to read a paper at Belfast next week, is Boyd Professor of Chemistry at Louisiana State University and is in charge of the Division of Analytical Chemistry there. Among his numerous published papers are several in conjunction with Professor Fritz Feigl, with whom Professor West worked in Brazil. In the new edition of Professor Feigl's well-known work, 'Spot Tests,' Professor West has collaborated in the introductory chapter and has written the chapter dealing with spot test techniques. He is the co-author or author of several books on various aspects of analytical chemistry and is on the publication boards of *Analytical Chemistry*, *Journal of Chemical Education* and *Mikrochema Acta*. He is a member of the Analytical Section of the International Union of Chemistry and of several of the commissions of that section.

The British Oxygen Company Limited announces the awards of the following three scholarships:—£500 a year, tenable for two years, at London University for research into the nature of rare gases to MR. B. F. FIGGINS, of London, N.8; £425 a year, tenable for two years, at Cambridge University for research in the Department of Metallurgy to MR. D. H. KIRKWOOD, of Orpington, Kent; £425 a year, tenable for two years, at Oxford University for research into the properties of materials at low temperatures to MR. R. D. MCCAMMON, of Belfast.

Obituary

The death occurred recently of MR. ALEXANDER KEMP, former managing director of Sandilands Chemical Works, Aberdeen. Joining the firm as an office boy, Mr. Kemp retired from the post of managing director in 1947 after 54 years' service. During the war he was area officer for Aberdeen fertilisers and chairman of Albumenoid Products Company.

Publications & Announcements

FACED with the problem of considerable expenditure on decade capacitor boxes for a large research and development programme, two development engineers at Winston Electronics Ltd., Hampton Hill, Middlesex, investigated the design of these instruments, starting from fundamentals. By designing a new type of eleven-position switch—now patented—a great saving in bulk and manufacturing costs was made. An instrument, which can be sold at a lower price than the cost of constructing 'home-made' apparatus in either the laboratory or factory resulted and is now being marketed. It should find wide application in electronic circuit testing, designing and building, production control and testing, research and technical laboratories.

* * *

RESEARCH over a wide field is conducted at Mellon Institute, Pittsburgh, Penn., USA, and the Institute's annual report, which details the work being done, runs to 56 pages, with a number of illustrations. Mellon Institute is 'an endowed, non-profit corporate body for conducting comprehensive investigations on important problems in the pure and applied natural sciences, for training research workers and for providing technical information adaptable to professional, public and industrial advantage.' Seventy-six Fellowships were in operation between March, 1953, and March, 1954, ranging from acid recovery to zirconium.

* * *

THE story of the building of Vacuum Oil's refinery at Coryton, Essex, by The Lummus Co. Ltd., is told in an attractive booklet produced by Newman Neame Ltd. Lavishly illustrated, the booklet describes the entire construction programme from the preparation of the site in 1950 to the moment when the refinery came 'on stream,' including the setback caused by the East Coast floods in January, 1953. The refinery was opened by HM The Queen Mother in May this year.

* * *

MORE than 500 references bear witness to the continuing activity of the abstracting staff of the Coal Tar Research Association in *Review of Coal Tar Technology*, July-December 1953. Copies are obtainable (price 7s. 6d. to non-members of CTRA) from Oxford Road, Gomersal, near Leeds.

TWO new commercial chemicals, N-butyl aniline and N-2-ethylhexyl aniline, are now available for the first time in drum quantities from Carbide & Carbon Chemicals Company, 30 East 42nd Street, New York 17, a Division of Union Carbide and Carbon Corporation. The introductory price for these compounds in drum quantities is 75 cents lb. f.o.b. South Charleston, West Virginia, USA. When produced in large quantities, prices can be reduced substantially. Compared with aniline and the lower N-alkyl anilines, these new products have several advantages, such as lower water solubilities, higher boiling points, lower vapour pressures, lower toxicities, and higher solubilities in oil or hydrocarbons. They should be applicable in processes requiring N-alkyl anilines in the production of dyes and pigments, surface-active agents, flotation reagents, explosives and propellant stabilisers, gum and corrosion inhibitors, oil and gasoline additives, rubber chemicals, resins and plastics, textile processing chemicals, pesticides, varnishes, and coatings.

* * *

NAMES, addresses and telephone numbers of people now operating denationalised long-distance transport are contained in the July-December 'ABC Goods Transport Guide' just published by *Motor Transport*. Other sections of the Guide give details of parcels services; names, addresses and telephone numbers of clearing houses; machinery carriers; bulk liquid carriers; British Road Services and railway offices; warehouse keepers; London public wharfingers; and air charter services. The Guide, which costs 3s. 6d., including postage, can be obtained from all newsagents or direct from the publishers, Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1.

* * *

A MONOGRAPH on 'Some Recent Advances in Physical Chemistry' has been published by The Royal Institute of Chemistry. It is based on a lecture by Professor A. R. J. P. Ubbelohde, M.A., D.Sc., F.R.I.C., F.R.S., to the London Sections of the Institute and the Society of Chemical Industry at the Institute of Metals, Grosvenor Gardens, London, S.W.1, on 24 March, 1954.

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

BARCLAY-STUART (PLASTICS) LTD., London, W. 23 July, two mortgages to Martins Bank Ltd., each securing all moneys due or to become due to the bank; respectively charged on 25 and 27 Brunswick Street and 16-26 (even) Duke Street, Luton, and land formerly the site of 12 and 14 Duke Street, Luton, with plant, fixtures, etc., in each case. *—. 30 December, 1953.

MANGE PLASTICS LTD. (formerly J. J. Wade Ltd.), London, N. 23 July, charge to Barclays Bank Ltd., securing all moneys due or to become due to the bank; charged on certain contract moneys. *Nil. 12 January, 1954.

Receiverships (Appointment or Release)

NEWBALL & MASON LTD., manufacturing and exporting chemists and distillers of essential oils, etc., Beech Avenue, Nottingham. Wm. R. Coope, C.A., of 9 Clarendon Street, Nottingham, was appointed Receiver on 19 August, 1954, under powers contained in debenture dated 26 October, 1948.

Increases in Capital

The following increases in capital are announced:—GREEFF-CHEMICALS HOLDINGS LTD, from £325,000 to £525,000; CHAS. PAGE & CO. LTD., from £100,000 to £150,000; IMPERIAL CHEMICAL INDUSTRIES LTD., from £120,000,000 to £220,000,000; ECONOMIC UTILITIES LTD, from £1,000 to £25,000.

Change of Name

The following change of name has been announced:—WENDT (GREAT BRITAIN) LTD. to PERSTORP PRODUCTS (GREAT BRITAIN) LTD., on 30 June.

New Registrations

PRM (London) Ltd.

Private company. (537,330.) Capital £100. Exporters of and dealers in plastics, chemicals, gums and other materials, etc. Directors: Geo. L. Cheeseman and Mrs. Johanna Forster. Reg. office: 5/6 Bucklersbury, London, E.C.4.

Nutritional Products Ltd.

Private company. (537,149.) Capital £100. To manufacture and deal in vitamins and pharmaceutical products, food, provisions, groceries, etc. Subscribers (each with one share): Harold L. Yorke and Geo. Lawrence Smith. Harold L. Yorke is the first director. Reg. office: 24 Notting Hill Gate, London, W.11.

Distrene Ltd.

Private company. (537,161.) Capital £100. Manufacturers of and dealers in polystyrenes and modified polystyrenes, etc. Subscribers (each with one share): W. Munro Forrest and J. Gilderdale. The first directors are to be appointed by the subscribers.

C. D. Renny Ltd

Private company. (537,076.) Capital £6,000. Manufacturers of and dealers in medicinal supplies, patent and other medicines, drugs, poisons, tonic foods, etc. The permanent directors are: Cyril D. A. Renny and Florence M. Renny. Reg. office: 73B North Street, Guildford, Surrey.

Horace Priest Chemical Engineering Co. Ltd.

Private company. (537,092.) Capital £2,000. Consulting and contracting chemical engineers, distillers, refiners, blenders and manufacturers of acid residues and other products resulting from the carbonisation of coal, etc. Directors: Horace Priest (permanent director and chairman) and Miriam A. Priest. Reg. office: 'Beverley,' Farthings Hill, Horsham, Sussex.

Ardite Ltd.

Private company. (537,181.) Capital £100. Manufacturers of and dealers in chemical and industrial products and explosive substances of all kinds, etc. Subscribers (each with one share): K. E. Wright and R. A. Clark. The first directors are not named.

COMPANY MEETING

Benn Brothers Limited

Tribute Paid to Sir Ernest Benn at Annual Meeting

THE fifty-eighth annual meeting of Benn Brothers Ltd. (proprietors of THE CHEMICAL AGE) was held on 27 August at Bouverie House, Fleet Street, London, E.C. Mr. Glanvill Benn, chairman, presided, and, in the course of his speech, said:

This publishing house was founded by Sir John Benn, editor and publisher of *The Cabinet Maker*, a great citizen of London. His eldest son, Sir Ernest Benn, starting at 16 as an office boy, devoted himself to the business to leave his father free to pursue his public life. He had scarcely come of age before he began to expand, taking over *The Hardware Trade Journal* from Hazell, Watson & Viney. For the rest of his life, I must add in parenthesis here, he never ceased to speak with gratitude of the help that great firm had given to him as a struggling young man.

His first-hand knowledge of businessmen all over the United Kingdom, acquired 'on the road'—how proud he was in later years to be Festival Chairman of the Royal Commercial Travellers' Schools—convinced him of the merits of free enterprise. Later, during the First World War, at the Ministries of Munitions and Reconstruction, he had similar first-hand experience of bureaucrats and planners and formed the opinions for which he became famous.

Opinions Respected

As an individualist he must often have seemed to himself to be a voice crying in the wilderness in an age when the governments of the world accepted the gospel of Keynes as final revealed truth. Today there are signs that the individual is coming into his own again; and that the democracy of free markets operating in full view of the public is seen to have advantages over the closed doors and smoke-filled rooms of the planners. The voice of Sir Ernest Benn is stilled, but his opinions are increasingly respected.

The man who built this business was not, as all who had the privilege of knowing him personally are well aware, the stern advocate of a free fight and devil take the hindmost. In a Christian free society the strong must take care of the weak, and the fortunate of the unfortunate. All his life Sir Ernest, without boasting or self-righteousness, was quietly generous with his money, brains and energy, and many are the individuals and organisations who remember his help with gratitude. His colleagues on the board of this company are glad to have been able to mark his passing by contributions to several of the benevolent societies with which he was particularly identified.

A Remarkable Man

You came to the meeting today to hear an account of the progress of the company during the past financial year, but I make no apology for giving you first of all this brief reminder of the remarkable man who was the mainspring of the business for so many years. The records show that from 1897 to 1953 inclusive he missed only two of these annual meetings.

Listed with the directors' report and accounts are the journals and directories published from Bouverie House. I report that all continue to prosper because they give readers and advertisers throughout the world the news and services which are vital to the successful conduct of their own trading activities.

A year ago, in addressing you on the favourable results then achieved, I thought it wise to express a word of caution in viewing the trading prospects. The business of the year now under review has, however, been very solidly maintained and the trading profit is substantially the same as in the previous year.

All the commodities in common use are free and unrationed at last, except paper and coal. Also the expansion, renewal and replacement of printing plant has not yet caught up with the insatiable postwar demand from a greatly enlarged reading public. That is why some of our journals still appear in wartime austerity size. There is reason to hope, however, that before the

next annual meeting, more will have thrown off these hampering restrictions.

Perhaps the most truly international of our specialised papers dealing with particular industries is *The Timber Trades Journal*. Tribute by the Government to its influence was the recent appointment of its former editor and our managing director, Mr. Norman French, to the Departmental Committee on Marketing of Woodlands Produce.

Record Weekly

The report mentions the largest issue of a weekly ever published anywhere in the world—*The Hardware Trade Journal* of 30 March. The issue was not a flash in the pan, however. Week by week hardware traders at home and importers abroad wait eagerly for the mass of information essential to their business with which *The Hardware Trade Journal* provides them.

You will have noticed a special allocation of £10,000 to the Jubilee Pension Fund in memory of Sir Ernest Benn over and above the normal annual contribution of £8,000 or £9,000—making a total addition to the fund for the year of £19,588. This is obviously more than the obligations of the fund require; twice as much, in fact. Your directors recommend this large increase in order to give them scope for further pension developments in future, and as another reminder of a man who was a pioneer of good working conditions. He introduced the five-day week nearly forty years ago, for example; while retirement allowances, often on scales that no insurance company scheme could match, have been the practice of this company since its earliest days.

Staff Praised

The men and women who work in Bouverie House, and in our offices in Birmingham, Glasgow, Leeds and elsewhere, editors, managers, journalists, representatives, clerks, typists, packers and the rest have all made their contribution to the results and the proposed dividends that I now have the pleasure of submitting for your approval. I know of no better team and I am very grateful to them.

The report and accounts were adopted. Sir John Benn, the director, retiring by rotation, was re-elected to the board.

Market Reports

LONDON.—A steady flow of new business has been reported from most sections of the industrial chemicals market. Delivery specifications in the home market have covered good volumes, while the call for shipment is on a broader basis with the recent expansion in demand continuing. There have been no important price changes during the week and the undertone of most sections of the market remains firm. The position in the coal tar products market remains unchanged, prices are steady and there is a ready outlet for most items.

MANCHESTER.—Activity has been well maintained on the Manchester market for heavy chemicals during the past week. A fair number of fresh inquiries have been dealt with, deliveries of the soda compounds and other lines are being taken up satisfactorily under contracts, and replacement business is coming forward steadily as the need arises. Values are well held pretty well throughout the range. Basic slag and the compounds seem to be the busiest sections of the fertiliser trade, which otherwise is still only moderately active. Most of the light and heavy by-products continue to be taken up in good quantities.

Food Chemistry Course

THE chemistry of microscopy of food, drugs and water will be studied during a special course of lectures and practical work starting on 28 September at the Department of Chemistry, Chelsea Polytechnic. The course, for first year students, is based on the syllabus of the examination for the Fellowship of the Royal Institute of Chemistry (Branch E). It will be held on Tuesdays and Thursdays from 6 to 9 p.m. and will extend over two complete sessions.

Among the subjects to be studied are the origin, compositions and methods of analysis of food, the chemistry, analysis and microscopy of drugs, the chemical and bacteriological examination of water, sewage and effluents, bacteriology, toxicological analysis and the acts and regulations relating to food, drugs and poisons. Lecturer in charge will be Mr. R. G. Minor, F.P.S., F.R.I.C. The course fee for each session is 4 guineas, with a laboratory fee of 5s. and a registration fee of 1s.

THE FOUR-WAY SERVICE of N·I·F·E·S

The National Industrial Fuel Efficiency Service — **Now Fully Operational** — *wishes to co-operate with all individuals, firms or organizations promoting efficient use of fuel, heat and power.*

The recently published booklet **"The Four-Way Service of N·I·F·E·S"** describes what the National Industrial Fuel Efficiency Service is and does. It is written in general terms but it would be worthwhile for you to have a copy by you. It will be gladly sent—free—on request. Please mention this journal when writing.

It is in the general interest of all concerned with the use of fuel, heat and power either as manufacturers of installations, as engineers or consultants that N·I·F·E·S should be widely known. N·I·F·E·S is their natural ally in pressing for the efficient utilization of all forms of fuel and the extended use of up-to-date plant.

N·I·F·E·S is going to do everything in its power to ensure that industry becomes increasingly aware of the importance of the correct use of fuel, of heat and steam and of insulation. Will you do your part and help to get the widest possible circulation for the booklet.

National Industrial Fuel Efficiency Service

71 Grosvenor Street London W1 *'Phone:* Hyde Park 9706

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order, 1952.

A. BOAKE, ROBERTS & CO., LTD., LONDON, E.15. require **SENIOR CHEMISTS** for their Process Development Department. These appointments would appeal to qualified men with some years of experience of Organic Chemistry, seeking the opportunity to lead a team in developing new projects from laboratory to plant scale, so as to provide new or improved products. The minimum salary envisaged is £800 per annum.
The company also requires **ASSISTANT CHEMISTS** to participate in these projects. Industrial chemical experience is desirable in these appointments. Minimum salary is £550 per annum. Applications in detail to **PERSONNEL MANAGER.**

A. BOAKE, ROBERTS & CO., LTD., require the services of **SHIFT CHEMISTS** for Plant Control work. Academic qualifications will be an advantage, but are less essential than industrial experience. The work is interesting and varied, and the appointments will be progressive. There is every opportunity for advancement. Initial salary will be in the range of £600 to £700 per annum.
Applications plainly marked "Shift Chemists" to **PERSONNEL MANAGER, A. BOAKE, ROBERTS & CO., LTD., 100, CARPENTERS ROAD, LONDON, E.15.**

CHEMIST Wanted, fully qualified and experienced Industrial Oil Chemist. Should have knowledge of Metallurgy. Special superannuation scheme in operation. Apply, stating previous experience, salary required, etc., to **FISHER'S FOILS, LTD., EXHIBITION GROUNDS, WEMBLEY, MIDDLESEX.**

OPPORTUNITY occurs in established **CHEMICAL MERCHANTS** in **LONDON** for suitable applicant with knowledge of products used in chemical and pharmaceutical trades and experience of U.K. and foreign markets. Good correspondent required. Staff Pension Scheme. Write with full particulars of experience, education and salary required to **BOX No. C.A. 3348 THE CHEMICAL AGE, 154 FLEET STREET, LONDON E.C.4.**

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CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" WORKS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE 3285 EAST.**

ONE TORRANCE MICRO TWIN-ROLLER MILL. Cast rolls, 14 in. by 8 in. Water cooled. Fast and loose pulley-drive.
TWO DE LAVAL SEPARATORS, VEE-BELT DRIVE. Good condition.
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STAINLESS PRESSURE TANK, 19 ft. by 5 ft. diam., 110 lb. w.p. Unused.
Whessoe Riveted Steel **MIXING TANK,** 13 ft. diam. by 15 ft. deep, 9-16 in. plate, cone base.
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SIX Stainless Steel **JACKETED PANS,** 60 galls.
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SIX Aluminium **CONDENSERS,** 14 ft. long by 2 ft. 6 in. diam. 386 Tubes, ¾ in. o.d.
FORTY Riveted **RECEIVERS,** 8 ft. 6 in. long, 5 ft. 6 in. diam., 75 lb. w.p. Numerous other sizes.
Solid Drawn **STEEL PIPES,** 6 in., 8 in., 10 in., 12 in., 14 in., thousands of feet in stock, plain and flanged.
CAST-IRON PIPES. 400 yds. 8 in. **NEW.** Also most other sizes, up to 24 in. bore.
VALVES in Stainless, Gunmetal, Enamel Lined.
Free Catalogue. "Watkins Machinery Record," available.
FRED WATKINS (BOILERS), LTD., COLEFORD, GLOS.

ONE BERTRAM TWIN ROLL FILM DRIER, with steam-heated rolls 60 by 28, complete with motor, starter, vapour hood, etc. In first-class condition.
One ½-ton **GARDNER RAPID MIXER,** with trough approx. 8 ft. long by 3 ft. by 3 ft.
Six Brand New **STERILISING VESSELS**—7 ft. long by 3 ft. diam.
One 4 ft. Positive-driven **EDGE RUNNER MILL,** with reduction gear, motor and starter.
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Two Steam-jacketed **CAST-IRON FILTER PRESSES,** each with 38 s.j. plates and 39 frames, cake size 2 ft. 4 in. square.
Several Johnson **CAST-IRON FILTER PRESSES,** various sizes and types.
GARDNER Mixers, and Mixers and Sifters combined, sizes "E," "G," "H," "J" and experimental.
HYDRO EXTRACTORS—24 in., 30 in. and 36 in.
Two Gardner "H" size Steam-jacketed **MIXERS.**
Two 18 in. **KEK PLATE MILLS,** with feeders, delivery bins, motors and entablature.
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1,500 gal. **WELDED ALUMINIUM CYLINDRICAL ENCLOSED TANK.**
Ditto, 1,000 gal. (Vehicle type).
(Unused) **PORTABLE ELECTRIC STIRRERS**—400/3/50.
SMALL "GARDNER" EDGE RUNNER—18 in. diam. by 6 in. deep.
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JACKETED CYLINDRICAL MIXING PANS—40 up to 300 gallons.
(Unused) **BRASS SHELL CONDENSERS**—42 in. by 5 in., with 325—¼ in. copper tubes.
ELECTRIC HYDROS—11 in. by 12 in. Stainless steel type baskets. 220/1/50.
"Z"-BLADE PLAIN AND JACKETED MIXERS—up to 42 in. by 28 in. by 38 in. deep.
PUMPS, BOILERS, OVENS, DRYERS, STILLS, PANS, etc.
HARRY H. GARDAM & CO., LTD., STAINES.

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SEVERAL HORIZONTAL JACKETED TILTING MIXERS, 25 gallons capacity. New and unused.
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ONE 600 gallon **JACKETED AUTOCLAVE** with detachable cover, in **STOCK.** 150 lb. p.s.i. in jacket.

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A selection in stock—**BROADBENT and WATSON LAIDLAW**—72 in., 60 in., 48 in., 42 in., 36 in. and 30 in.

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A selection of **MONO** and other Pumps in stock—2 in. to 5 in. New and second-hand.

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INDUSTRIAL BY-PRODUCTS, LTD., 16, Philpot Lane, London, E.C.3, will be pleased to receive particulars of any by-products, waste materials and residues for disposal.

WANTED—DIRTY SOLVENTS. Distillation Plant and Tank Storage facilities available. Large and small quantities required. Own rail siding. **T.T.P., LTD., BEDDINGTON LANE, WEST CROYDON.** 'Phone : Thornton Heath 5561/3.

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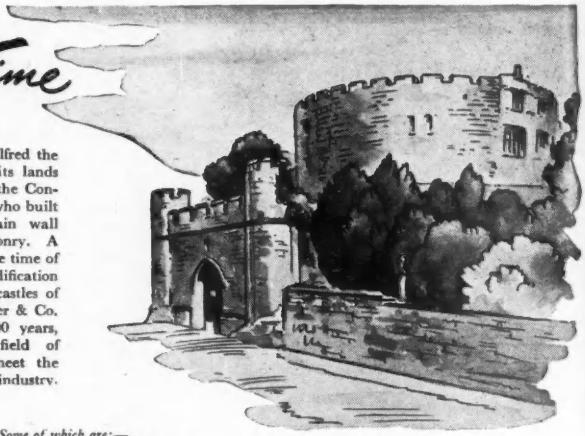
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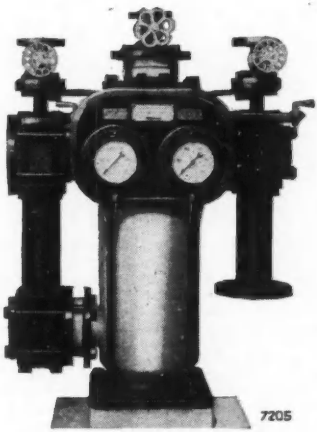
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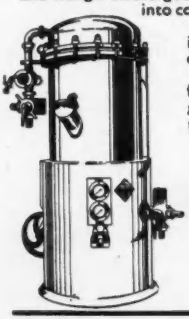
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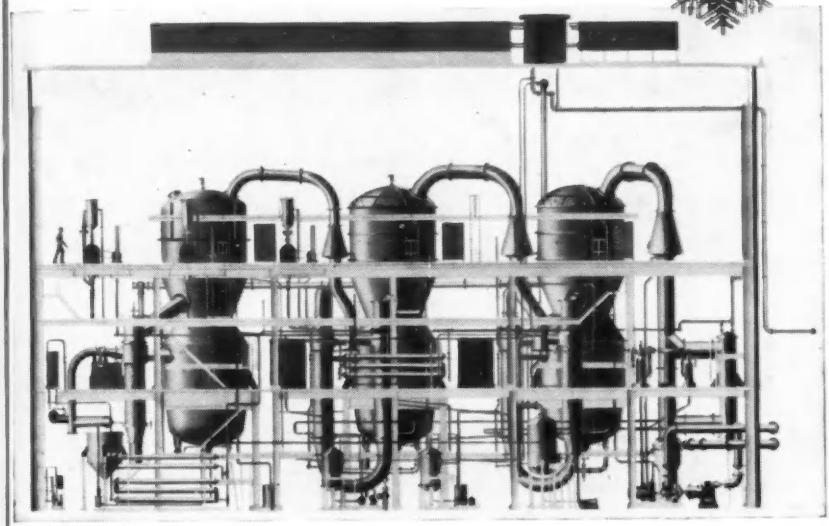




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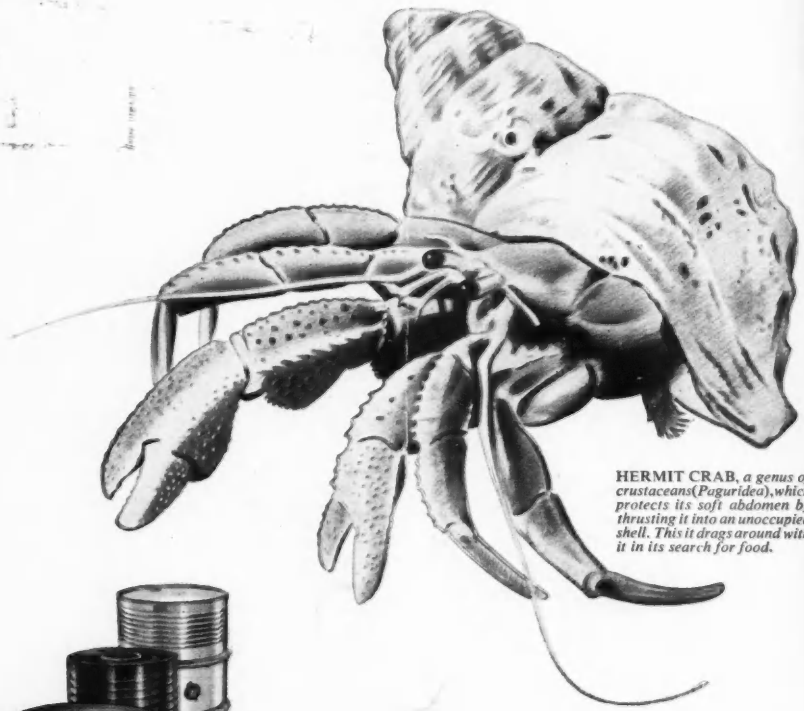
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